

February 1944

TECHNOLOGY REVIEW

* Title Reg. in U. S. Pat. Office



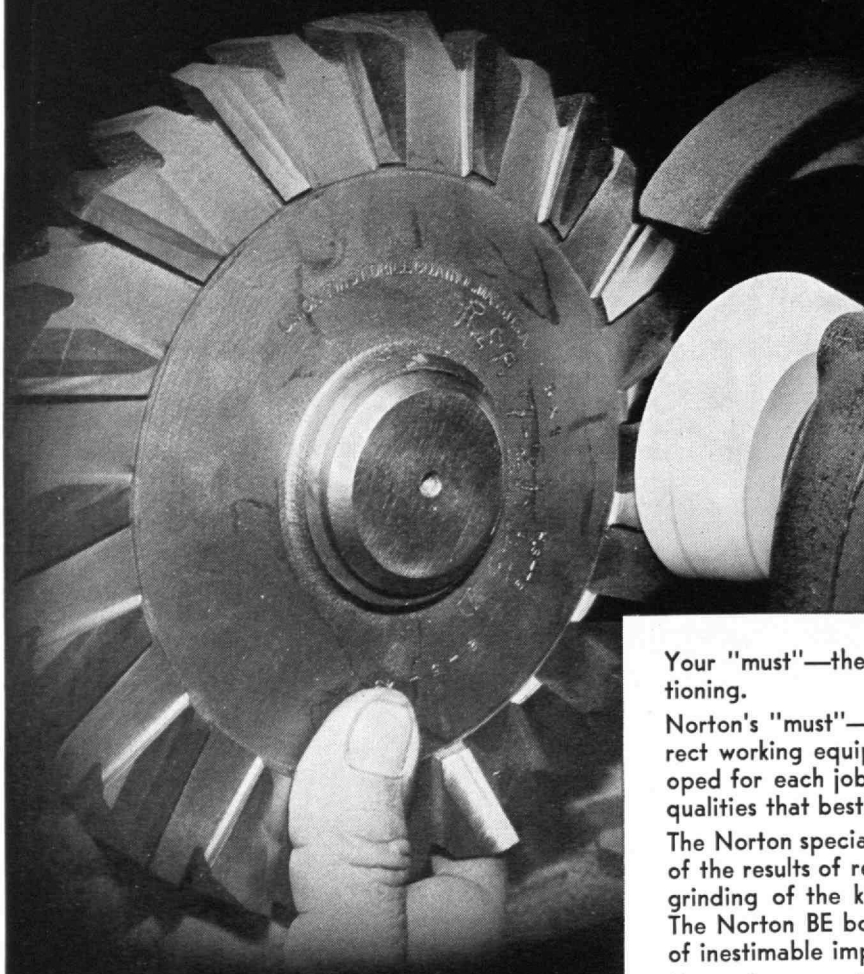
technology review

Published by MIT

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"Must" for Aviation TOOL GRINDING

*Skill plus correct
Grinding Wheel*



Your "must"—the skill for a cutting-tool conditioning.

Norton's "must"—to give your skilled men correct working equipment—grinding wheels developed for each job of the shape, size and cutting qualities that best meet the conditions.

The Norton special 38 Alundum abrasive was one of the results of research to solve the problem of grinding of the kind required in the tool room. The Norton BE bond is another that has proved of inestimable importance in tool-room grinding.

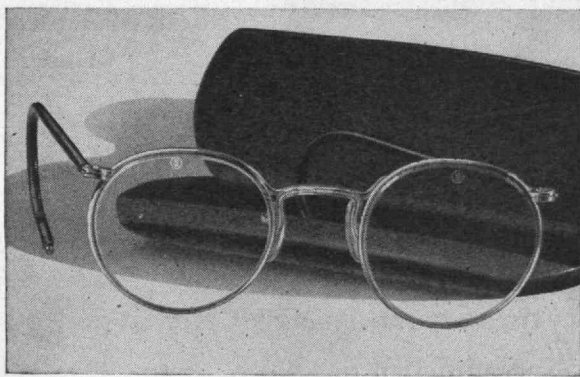
Up to the present time, you need look no further for abrasive and bond satisfaction, but you, too, may benefit from the Norton knowledge of shop performance on the variety of cutting-tool metals in use.

NORTON COMPANY, Worcester 6, Mass.

Behr-Manning, Troy, N. Y., is a Norton Division
Photo courtesy North American Aviation, Inc.

» **NORTON ABRASIVES** «

He had no peer
as a Tool Maker...
until he lost an eye



**...all workers on or near
Eye Hazardous Jobs
need AO GOGGLES**

Are the highly skilled men in your plant wearing goggles? The price of the finest pair of AO Goggles is trifling compared with the loss — even for half a day — of the services of one of your skilled men.

An adequate eye protection program that provides AO goggles for every man and

woman who works on or near an eye hazardous job will pay for itself in a few months. AO Goggles are designed to give maximum protection and workers find them comfortable to wear. Ask your Safety Director to get in touch with the American Optical Company's branch office nearest you.

American  Optical

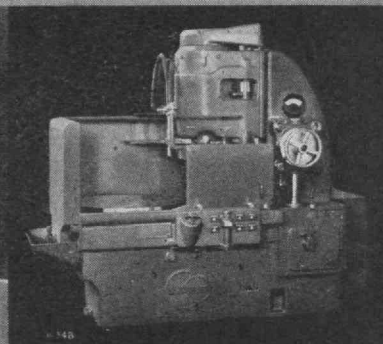
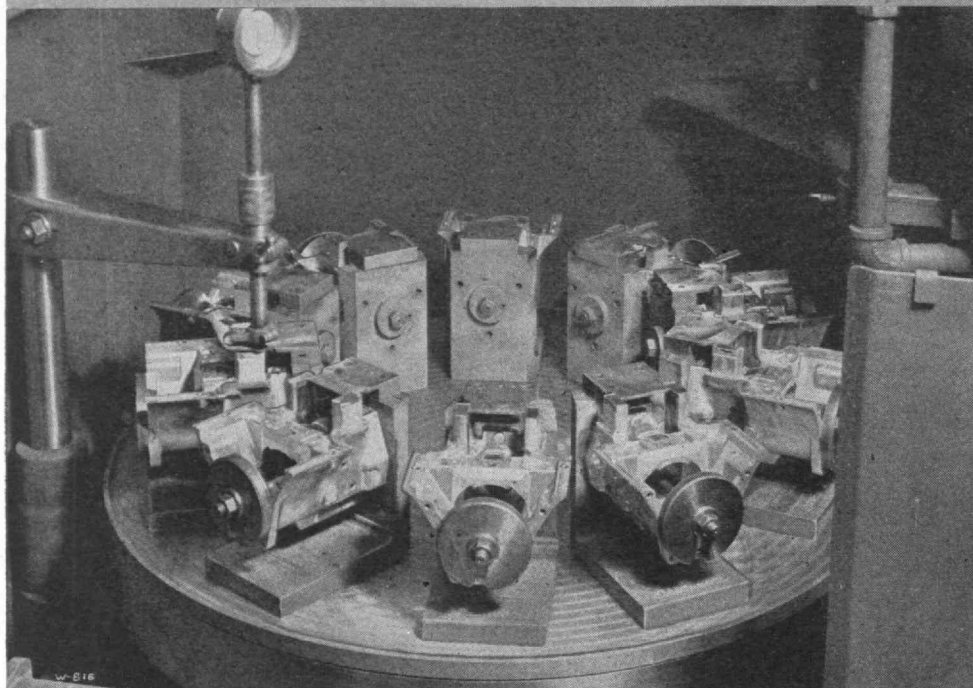
COMPANY

SOUTHBRIDGE, MASSACHUSETTS

Manufacturers for more than 110 Years of products to Aid and Protect Vision. Branches in all principal industrial centers

THE TECHNOLOGY REVIEW, February, 1944. Vol. XLVI, No. 4. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription \$3.50; Canadian and Foreign subscription \$4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

"PUT IT ON THE BLANCHARD"



Grinding Main Housing Poles for Magnetos on a No. 18 Blanchard Surface Grinder

Ability to remove metal quickly and cheaply makes it possible for Blanchard Grinding to carry through from roughing to finishing in one operation.

These Housing Poles for magnetos have .140" stock to remove from steel laminations. Ten

pieces are held on a Blanchard designed fixture on the No. 18 Grinder and 30 pieces are finished per hour.

The weight and rigidity of the Blanchard are essential for economical machining of parts such as these.

**CHECK THESE
ADVANTAGES
OF BLANCHARD
GRINDING**

- ★ **Production**
- ★ **Adaptability**
- Fixture Saving**
- ★ **Operation Saving**
- Material Saving**

Fine Finish

Flatness

Close Limits

★ *Especially valuable on jobs like the one illustrated.*

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASSACHUSETTS



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



A New Type of Ship Follows Her ...with the Same Type of Diesel

Below is a picture of the U. S. Maritime Commission ship American Manufacturer. She is one of the C-1 vessels propelled by Busch-Sulzer Diesel engines. The C-1's are giving a good account of themselves, delivering war cargoes on fighting fronts the world over.

Now a new type of Maritime Commission vessel will carry the battle to the enemy—the C1-MAV-I. Busch-Sulzer is proud, of course, that its

Diesel engines on C-1 ships made a reputation that has earned them the privilege of powering the new vessels. That reputation stems from nearly half a century of producing Diesel power noted for low operating cost, low maintenance cost and reliability. These factors will be offered to you when Victory ends our present schedule of 'round the clock production for the Army, Navy, Maritime Commission and high priorities only.



BUSCH-SULZER BROS. - DIESEL ENGINE COMPANY
S A I N T L O U I S



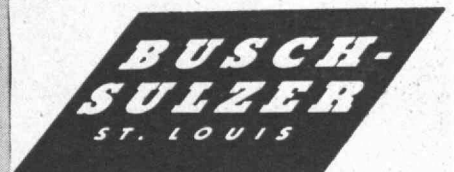
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AMERICA'S OLDEST
BUILDER OF
DIESEL ENGINES



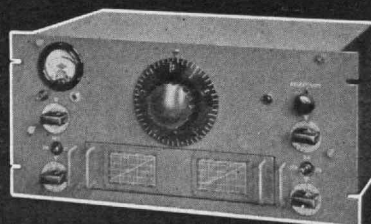
MEDIUM TANK, M-4
PHOTO BY
US ARMY SIGNAL CORPS

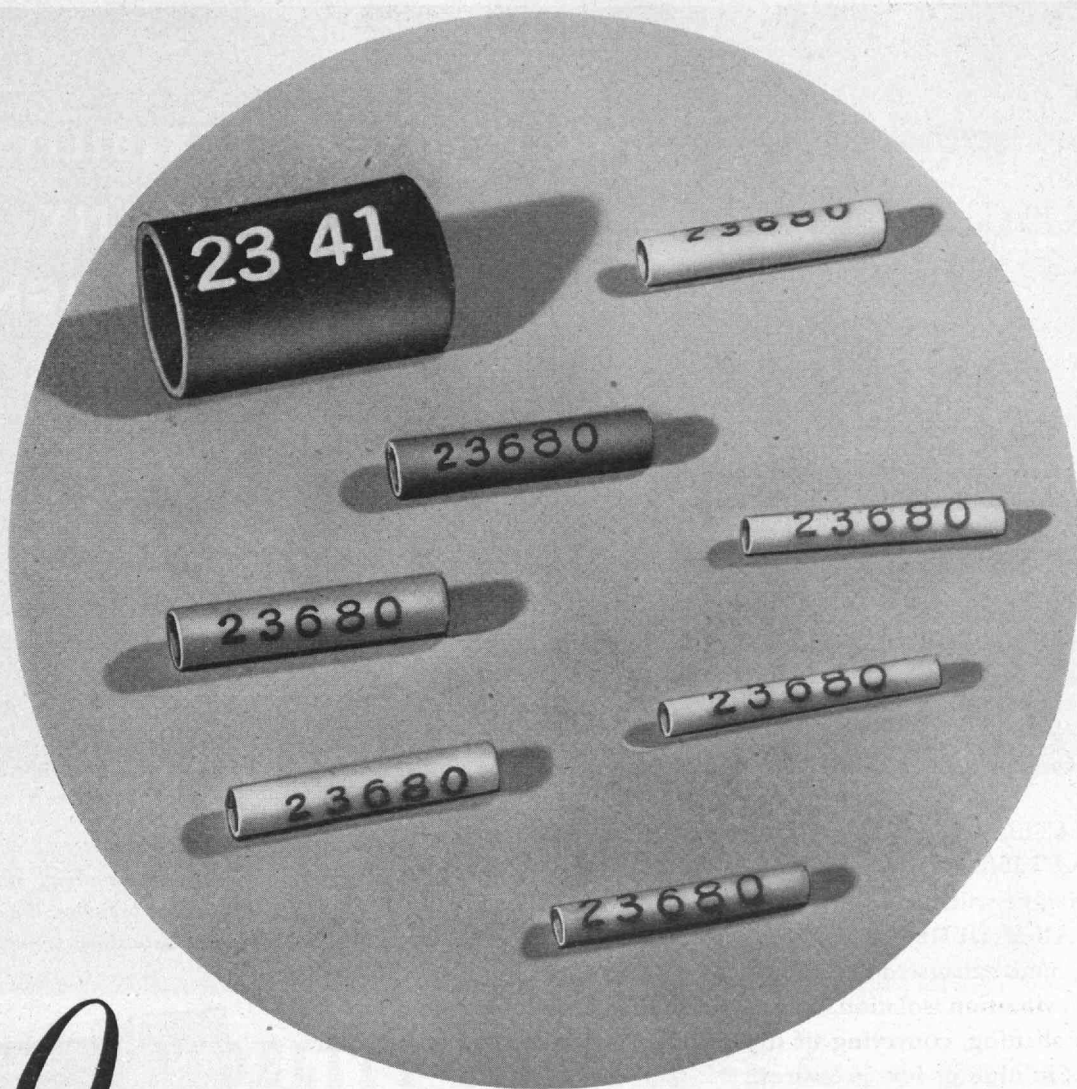
BUTTONED DOWN *and* ROLLING

Rolling all over the world. Hitting the enemy where it hurts him the most, covering infantry, scouting, fighting. Fighting and talking. Talking by radio to coordinate all in a pattern of Victory.



NATIONAL COMPANY, INC.
MALDEN, MASS.





Imprinted

TERMINAL INSULATORS AND IDENTIFICATION SLEEVES



THE identification of various electrical wires and cables is now a quick, easy job. For, Sandee Vinyl Sleeveings (made in all standard sizes) can now be cut to any lengths from $\frac{1}{4}$ " to $6\frac{1}{2}$ " and imprinted with identification marks or numbers! Sandee Vinyl Sleeveings are obtainable in all N.E.M.A. colors as well as black, white, and clear.

Electric wire and cable insulated with SANDEE compounds offer such advantages as:

1. High stability
2. High resistance to weathering conditions
3. Moisture absorption practically zero
4. High dielectric and ample tensile strength
5. Remarkable resistance to flame, abrasion, chemicals, oils, greases
6. Flexible at very low temperatures
7. Uniformity of size and quality

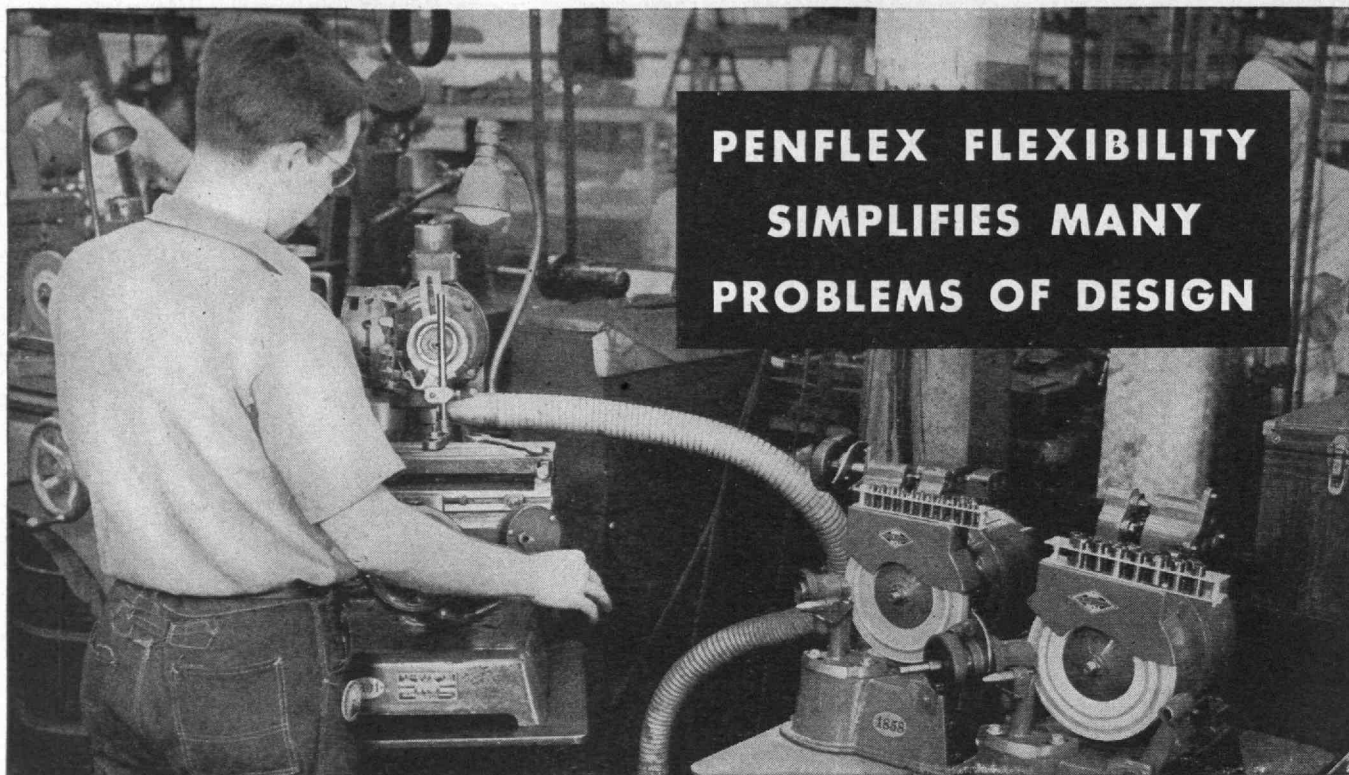
May we send you samples and complete information?

ELMER SZANTAY, M.E. '35, GENERAL MANAGER

Sandee Manufacturing Company

3945 NORTH WESTERN AVENUE • CHICAGO, ILLINOIS

EXTRUDED PLASTICS AND SPECIAL TOOLS



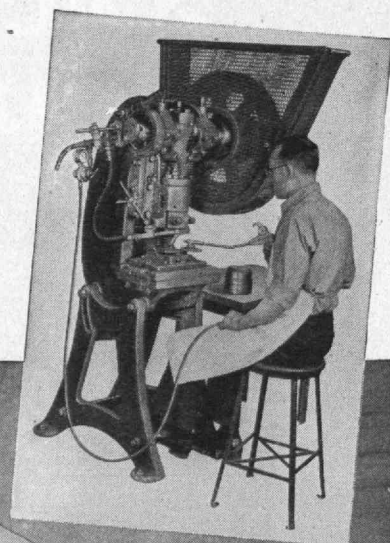
PENFLEX FLEXIBILITY SIMPLIFIES MANY PROBLEMS OF DESIGN

Photo Courtesy of Fidelity Machine Co.

ILLUSTRATED are several applications of PENFLEX Flexible All-Metal Hose and Tubing, showing how PENFLEX simplifies design problems. Light in weight with flexibility to make inaccessible installations easy, PENFLEX All-Metal Hose and Tubing are suitable for mobile units, bilge ventilation, fume exhaust, dust collection, coolant conveying, hydraulic and air controls, vibration isolation, oil can and similar flexible spouting, armor for flexible shafting, conveying of dry granular materials, and many other applications in high or low pressures.

PENFLEX, tight as pipe but flexible, follows any desired path. Material flows through smooth, easy bends without sharp turns to clog.

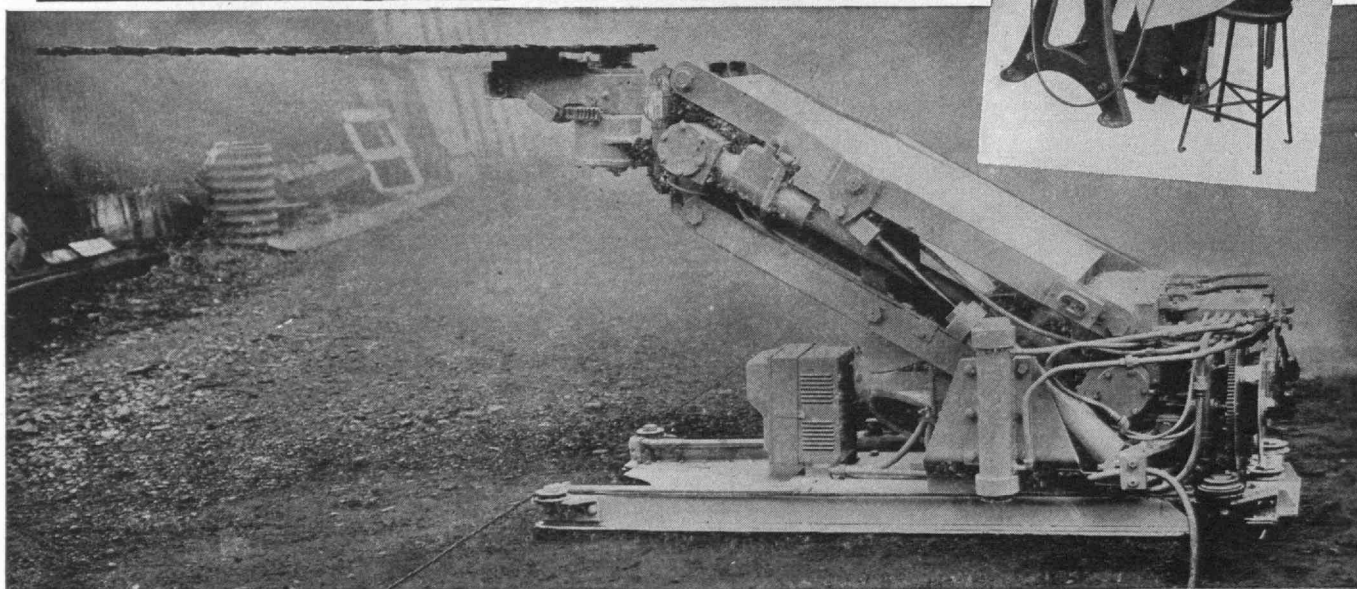
Tell us what type of material you are handling, and the operating pressures. We will send you data sheets promptly.

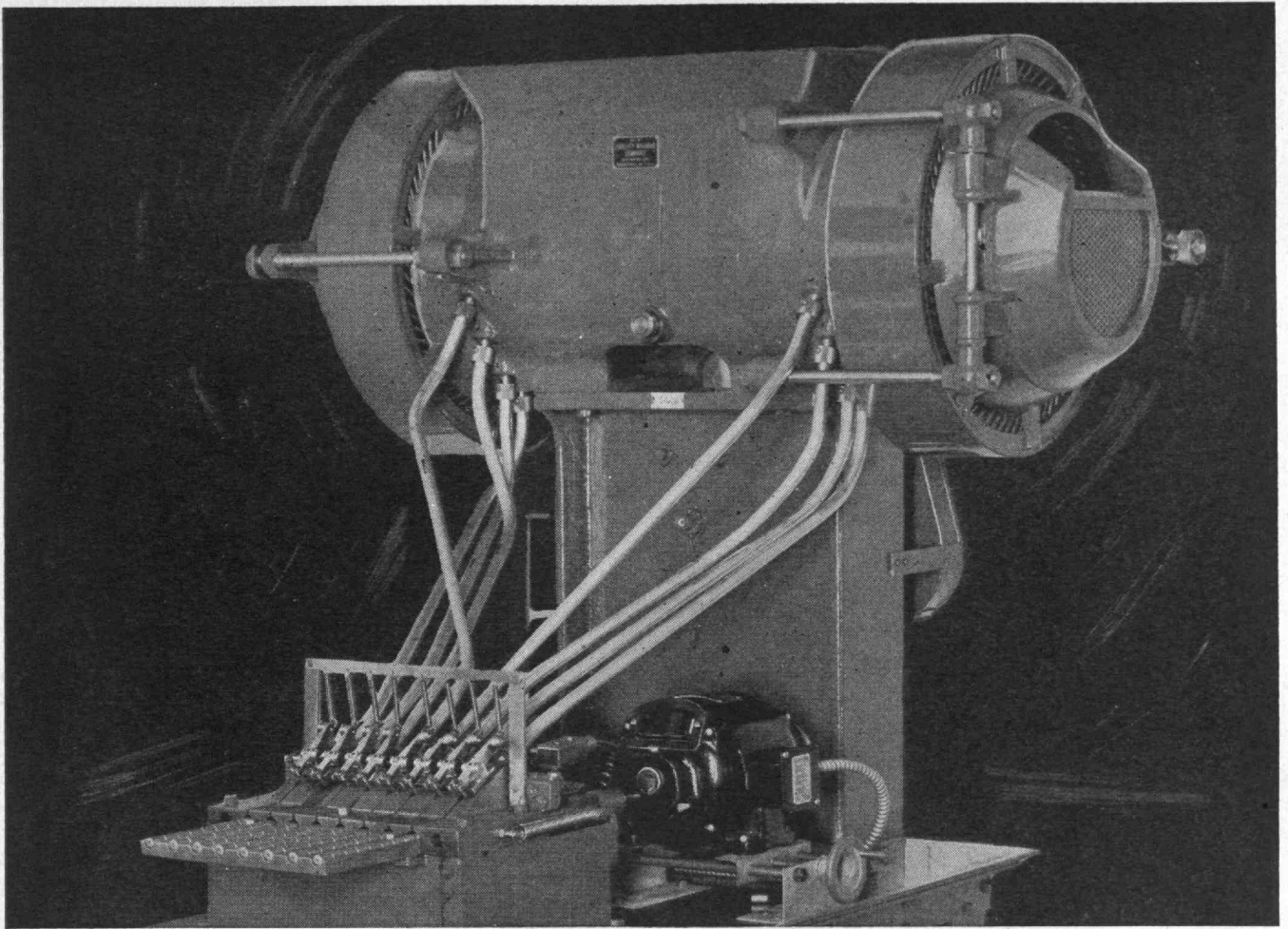


PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.

7215 Powers Lane, Philadelphia, Pa.

ESTABLISHED 1902





Another FIDELITY Machine — war-born with peace-time applications — perhaps for you

If you have many small metal parts which have had to be sorted and handled manually—in large quantities—you will be interested in this adaptable basic machine which FIDELITY has made in a number of variations.

The parts are dumped into a hopper from which they are fed out in single or multiple tracks, in correct position for the next process. In some cases, sequential steps are taken care of by additional mechanisms or attachments, made integral with the automatic hopper and feeder element.

The machine illustrated sorts and delivers copper slugs through eight tracks at the rate of 20 slugs per minute per track—a total of 160 per minute. . . . Receiving trays, platforms or troughs in such machines can generally be designed to function also as piece counters or batch boxes.

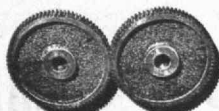
The range of FIDELITY'S developments in special machines designed and built to solve unusual and special production problems is described briefly in "Facilities."

A copy of this book is available if you write on your business letterhead.

BUY MORE BONDS



Designers and Builders of Intricate, Automatic Precision Machines



FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

How can machine tools avenge this

Dunkerque in Arkansas?



This is no enemy propaganda. No "usually well-informed sources" or Berlin broadcasts tell this tale. This is real . . . this is here . . . and this is defeat.

Our own private peacetime Dunkerque — in Arkansas, in New York, in West Virginia or California — in countless American "homes" where millions of people are ill-housed, ill-clothed, and bodily and mentally ill-fed.

What part will machine tools play in turning this kind of defeat into victory? The whole part, if the men of industry have the vision and the freedom to plan ahead, and to carry out what they plan.

If you are a manufacturer, there is one thing you can do at once: Have your production men and planners consult now with the engineers of the leading basic machine tool producers. They can help you in planning today your part in the peace that must be won after the war is won.

One of these is a Bryant man. . . . We invite you to send for him.



BRYANT CHUCKING GRINDER COMPANY

**SPRINGFIELD
VERMONT, U. S. A.**



Bausch & Lomb Contour Measuring Projector

Today Precision *Must* Be Commonplace



American fighting men on our fighting fronts depend upon production line accuracy . . . for ten-thousandths of an inch variation on the production line can mean the difference between a hit or a miss on the battleline.

The Bausch & Lomb Contour Measuring Projector makes such accuracy possible on the fastest moving production lines, because it takes many vital

inspection jobs "off the surface plate" and eliminates the tedious, time-consuming computations of the "sine bar." Inspections for accuracy become routine jobs.

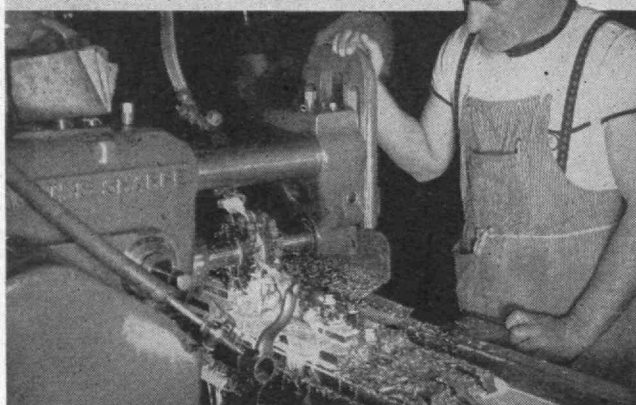
Throwing an accurate, sharply defined shadow image of the object under examination on a translucent screen, the B&L Contour Projector permits exact measurements or comparison with an enlarged template drawing at magnifications great enough for easy and accurate dimensioning.

Here again is a Bausch & Lomb peacetime development that serves America at War. The B&L Contour Measuring Projector is helping speed production of fighting tools for our fighting men.

For Bausch & Lomb Instruments essential to Victory—priorities govern delivery schedules.

BAUSCH & LOMB
OPTICAL CO. • ROCHESTER, N. Y.
ESTABLISHED 1853

**No. 12's MANY PRODUCTIVE FEATURES
HELP CONSERVE CUTTERS TOO!**



**No. 12 Plain Milling Machine just naturally
helps favor cutters — it has . . .**

Ample power — to pull the cut smoothly

Machine rigidity — for heavy loads without vibration



Brown & Sharpe Mfg. Co.
Providence, R. I., U. S. A.

42 Speed changes — permitting best
selection for cutter and work

28 Feed changes — Many may be used in
dual-combination to reduce cutting time

BROWN & SHARPE

**BATH
IRON WORKS
CORPORATION**

*Shipbuilders and
Engineers*

BATH, MAINE

THE TABULAR VIEW


Upshot. — This year witnesses success in a crucial race against time — the pitting of American ingenuity and industrial might against skyrocketing demands for rubber imposed by war. Reviewing the situation, BRADLEY DEWEY, rubber director for the War Production Board, emphasizes (page 195) the continuing need for conscientious conservation and considers some of the perplexing future questions which may be expected to grow out of our swift wartime creation of a major industry. A graduate of the Institute in 1909, Mr. Dewey served as colonel and chief of the gas defense division, Chemical Warfare Service, in the first World War, receiving the Distinguished Service Medal. He was recalled from the chemical industry to become deputy rubber director in September, 1942, becoming director in the fall of 1943.

Undaunted. — Science and technology are creations and creators of the free mind. Hence they have a special interest in all agencies working against oppression and authoritarianism. One such agency, of vital importance and growing strength in outraged Europe, is the underground press in occupied countries, described for *The Review* (page 197) by DOUGLAS C. McMURTRIE, who, says *Bookbinding and Book Production*, "has probably done more than any other man to advance the field of knowledge in typography and printing." Member of the Technology Class of 1910, Mr. McMurtrie is director of typography for the Ludlow Typograph Company.

Program. — The lone word "housing" is too easy a dismissal for the manifold problems involved in the rehabilitation and reconstruction of American urban and rural regions. That it muffles difficulties and at the same time conceals a myriad opportunities for various groups in the community is plain in the program trenchantly stated (page 200) by WALTER R. MACCORNACK, Dean of the School of Architecture at Technology. After his graduation from the Institute in 1903, Dean MacCORNACK engaged in widely diversified architectural practice, with major emphasis on the design of schools and college buildings and on problems of housing. He returned to Technology as dean in 1939.

Anthracite. — A story of pioneering in the development of steam propulsion for ships is told in this *Review* (page 202) by W. MACK ANGAS, Captain, Civil Engineer Corps, United States Navy. The ingenious Perkins family, whose steam yacht *Anthracite* was center of much interest, find an able commentator in Captain Angas, who has been a Navy man since shortly after his graduation from the Institute in 1917, and a keen student of maritime affairs for as many years.

Arcs. — Author of the first daily Washington column ever syndicated to newspapers, FRED C. KELLY has been a newspaperman most of his life. He runs a 600-acre farm. He has a stock of anecdotes beyond parallel. He writes nowadays when and what he pleases. The *Review* presents (page 192) gleanings from his recollections of the days when gaslight still flared high but saw its doom approaching in the brilliant arc lamps which Charles Brush made commercially practical.



Good service from reamers

Information supplied by an Industrial Publication

There are two operational factors that have more to do with the life and efficiency of reamers than may be generally known. One is the matter of feeds and speeds; the other, the condition of the hole.

As to the former—with due regard to machine set-up, required finish, and part design—in general, reamer speeds should be from 60 to 70% of drilling speeds, and feeds should be two to three times faster.

The amount of stock left in the hole has con-

siderable effect on reamer life. If there is insufficient stock, the reamer will tend to bind instead of cutting. This is also true with bell mouthed holes, caused by faulty drilling, or drilling without a guide bushing.

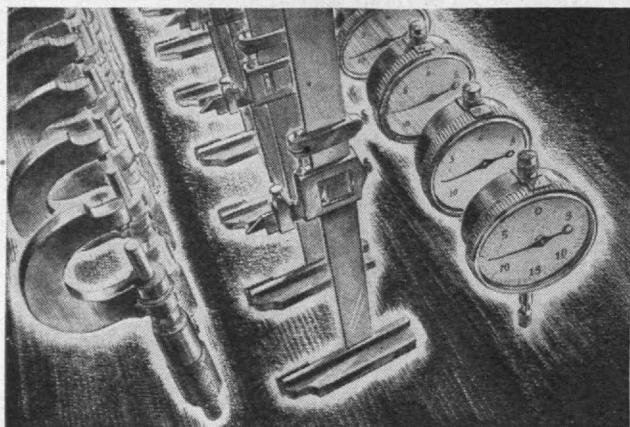
For efficient reaming in ferrous metals $1/64$ inch of stock should be left on holes up to $1/2$ inch diameter, and $1/32$ inch left in holes of greater diameter. A smaller amount of stock may be left in softer metals. The correct amount in individual cases can be determined by experiment.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING
DATA ON MOLYBDENUM APPLICATIONS.



MOLYBDIC OXIDE, BRIQUETTED OR CANNED •
FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City



ALL MADE TO STARRETT STANDARDS OF QUALITY AND ACCURACY, HOWEVER URGENT THE DEMAND

Starrett precision and Starrett workmanship have been steadfastly maintained despite the critical pressure for delivery of tools without which mass production of superior weapons and armament would never have been achieved.

The quality and accuracy of Starrett Tools will stand you in good stead whatever demands the future may make upon you.



THE L. S. STARRETT CO., Athol, Massachusetts, U. S. A.

WORLD'S GREATEST TOOLMAKERS

STARRETT

PRECISION TOOLS • DIAL INDICATORS • GROUND FLAT STOCK
HACKSAWS • METAL CUTTING BANDSAWS • STEEL TAPES



All Of Us Pause

... to think, at times, of the Future, and what it may bring. Diefendorf, a pioneer in precision cut, special gears, stands ready to supply peacetime America with the same high quality gears that now help America at war.

DIEFENDORF GEAR CORPORATION

D. W. DIEFENDORF '30, President
SYRACUSE, NEW YORK

diefendorf ★★★★★ GEARS

MAIL RETURNS

Forwarded

FROM WILLIAM F. RIVERS, '26:

Let me congratulate you on the March, 1943, issue of *The Review*, which has recently reached me [August 13]. The article by Clarence D. Howe, '07, concerning the Canadian viewpoint on handling munitions and supply contracts is extremely interesting to me and to others out here. It may please you, and him, to know that I have forwarded the March issue to New Delhi, where it will be seen by several persons holding jobs out here not dissimilar to Howe's.
Bombay, India

Contrast

FROM ALFRED V. DE FOREST, '11:

I notice in the article by Herbert S. Swan on page 90 of *The Review* for December a statement: "To progress we must produce more units at less cost. Not to do so means that we are slipping either into a static or into a permanently lower standard of living." This seems to me to reflect the general attitude of many technical and semitechnical publications and would seem to indicate that if people have more gadgetry they will make more progress. This particular poisonous philosophy may not necessarily attack technical men more than others, but at least they should be sufficiently educated to be on their guard against such expressions.

In contrast to this attitude, I quote from an address by David Sarnoff before the Lancaster branch of the American Association for the Advancement of Science on November 11: "Science is a mighty ally of freedom — its advance has brought much release from drudgery and from want. However, we must progress still further. For better machines are not all that is needed to make a better life. We shall have a better world only to the extent that our social thinking and our social progress keep pace with the advance of physical science."

Under the pressure of war, science has assisted in increasing production many millionfold, but the emotions of war have blunted our social thinking and hindered our social progress far below the level attained by Benjamin Franklin and Thomas Jefferson.

M.I.T., Cambridge, Mass.

Salute

FROM WILBUR MORPHY:

Very few of the numerous magazine articles these days discussing what aviation will be after the war can come up to S. Paul Johnston's in the January *Review*. It is a good hard-hitting job, and doesn't seem to be based on moonshine and wishful thinking. We need to have other rosy postwar pictures debunked in the same fashion.
Greenpoint, N. Y.

**Speed with
Economy**



Chas. Pfizer & Co., Inc.

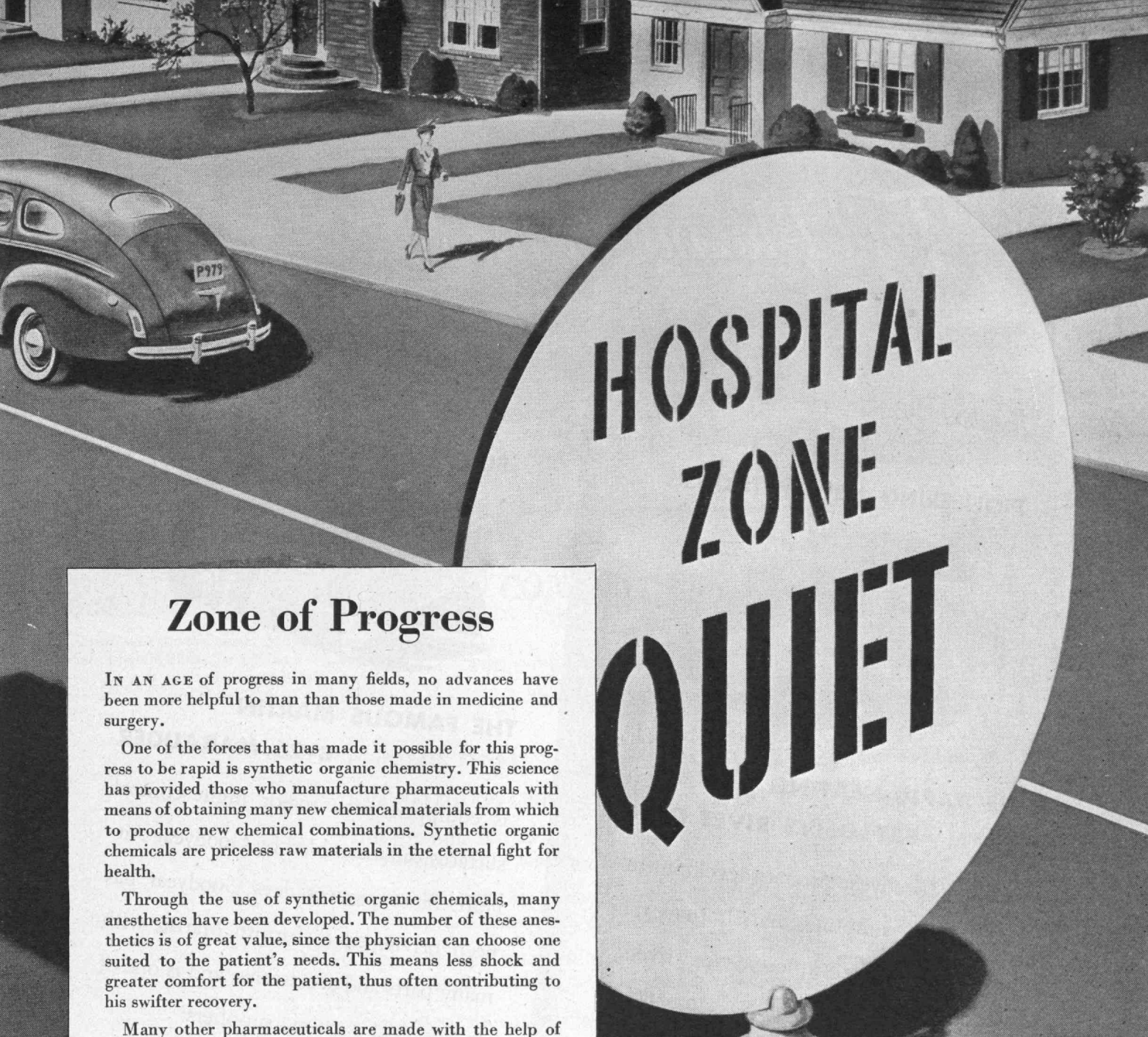
The ability to build *quickly* and *well* is not acquired overnight... When you engage us, you have an organization that has been geared for fast, closely-coordinated service ever since its formation — 26 years ago.

W. J. BARNEY CORPORATION

101 PARK AVENUE, NEW YORK

INDUSTRIAL CONSTRUCTION

Alfred T. Glasett, '20, Vice President



Zone of Progress

IN AN AGE of progress in many fields, no advances have been more helpful to man than those made in medicine and surgery.

One of the forces that has made it possible for this progress to be rapid is synthetic organic chemistry. This science has provided those who manufacture pharmaceuticals with means of obtaining many new chemical materials from which to produce new chemical combinations. Synthetic organic chemicals are priceless raw materials in the eternal fight for health.

Through the use of synthetic organic chemicals, many anesthetics have been developed. The number of these anesthetics is of great value, since the physician can choose one suited to the patient's needs. This means less shock and greater comfort for the patient, thus often contributing to his swifter recovery.

Many other pharmaceuticals are made with the help of synthetic organic chemicals. Anti-malarial substances, synthetic adrenalin, man-made vitamins, anti-pyretics (to cut down fever), many kinds of sedatives, vehicles in which drugs are administered, and solvents used in extracting drugs from natural sources are some of the medicinal aids made possible by these chemicals.

CARBIDE AND CARBON CHEMICALS CORPORATION, the Unit of UCC which pioneered in the field of synthetic organic chemistry, has made more than 160 synthetic organic chemicals available in commercial quantities. Many of these chemicals are important in various ways in the pharmaceutical industry.

Pharmaceutical manufacturers, and research and technical men in chemical and allied industries, are invited to send for a copy of the 100-page booklet P-2, "Synthetic Organic Chemicals," which technically describes the properties and some of the uses of these chemicals in pharmaceutical and other fields.

BUY UNITED STATES WAR BONDS AND STAMPS

HOSPITAL ZONE QUIET



SAVINGS FOR YOU! Synthetic chemicals in tank-car quantities serve as solvents and raw materials throughout industry to make more and better things at less cost to you.



COLD-PROOF! Coolant for liquid-cooled aircraft engines and base for anti-freeze in military cars and trucks is ethylene glycol, an important synthetic chemical.




MAGIC PLASTICS! Wonderful plastics that look like glass, stretch like rubber, and which are proof against water, sunlight, oils, and many chemicals are made from VINYLITE synthetic resins.



MAN-MADE All types of synthetic rubber require synthetic organic chemicals for their manufacture. Here's hope for tires for you in the future.

UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street  New York 17, N. Y.

Principal Units in the United States and their Products

ALLOYS AND METALS

Electro Metallurgical Company
Haynes Stellite Company
United States Vanadium Corporation

CHEMICALS

Carbide and Carbon Chemicals Corporation
ELECTRODES, CARBONS AND BATTERIES
National Carbon Company, Inc.

INDUSTRIAL GASES AND CARBIDE

The Linde Air Products Company
The Oxweld Railroad Service Company
The Prest-O-Lite Company, Inc.

PLASTICS

Bakelite Corporation
Plastics Division of Carbide and Carbon Chemicals Corporation

Trail Blazing in the Skies

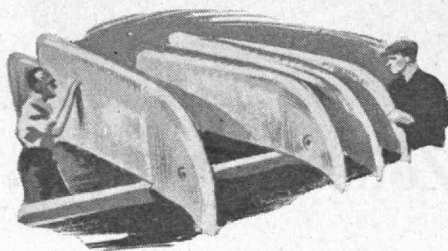
PIONEERING NEW METHODS



THE RAPID-HEATING EXPLOSIVE RIVET GUN

is a new Goodyear Aircraft development that greatly simplifies and shortens the work of setting explosive-type rivets. Lighter and easier to handle, it can be used on surfaces heretofore inaccessible with other equipment, speeding up production.

BUILDING PROVEN AIRCRAFT



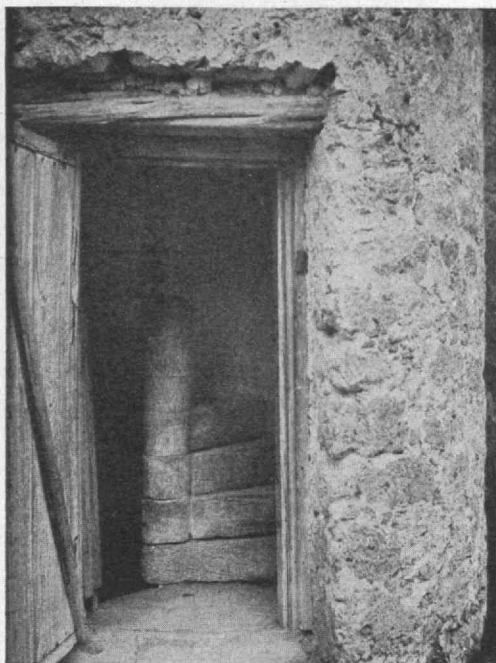
THE FAMOUS MARTIN B-26 MARAUDER

is equipped with major flight control surfaces, subassembled by Goodyear Aircraft. Since pioneer days Goodyear has been privileged to furnish Martin with many parts and accessories, and is one of its principal wartime suppliers.

HOW GOODYEAR AIRCRAFT CORPORATION SERVES THE AIRCRAFT INDUSTRY

1. By constructing subassemblies to manufacturers' specifications.
2. By designing parts for all types of airplanes.
3. By re-engineering parts for mass production.
4. By extending our research facilities to aid the solution of any design or engineering problem.
5. By building complete airplanes and airships.





William W. Lewis, '89

Spiral stair in the tower, Mission San José, San Antonio, Texas, founded in 1720. Each step is made of a single plank.

VOLUME 46

NUMBER 4

THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

EDITED

AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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From a photograph by Shipvan from Black Star

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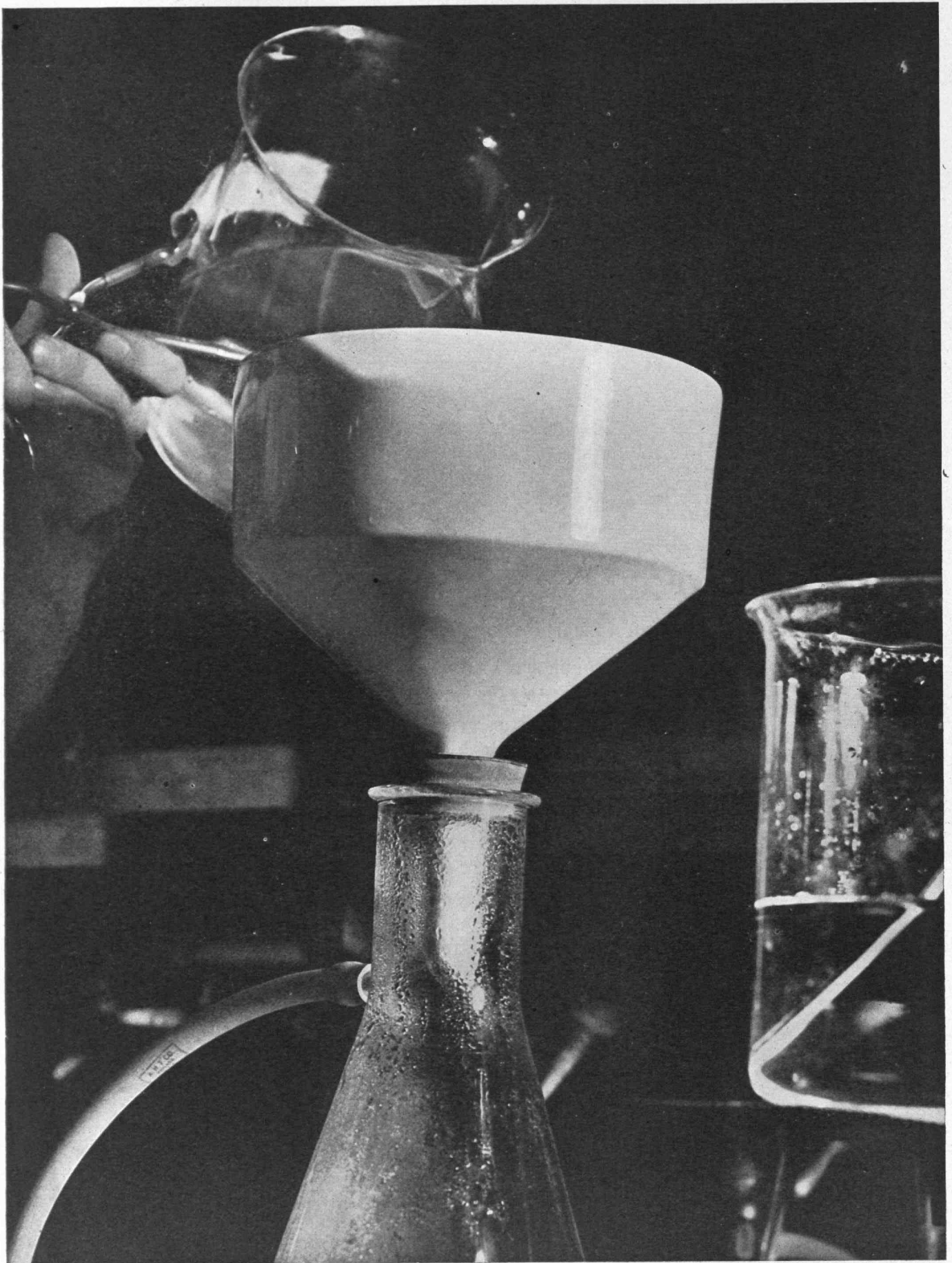
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The Trend of Affairs

Work to Be Done

HIGHER education, compressed, accelerated, and upset as it necessarily is during the war years, must expect to be in postwar years something considerably different from what it was a decade ago. It must become something nearer to what it then conceived itself to be, but was not. No thoughtful teacher or scholar denies this fact; on the contrary, the self-scrutiny which had begun to disturb the academic world before the war has increased in intensity, and possibly in promise of useful result, as the dislocations of war have broken down more and more of the sedative stockade of accepted and acceptable routine.

It is well that matters stand thus, for higher education very properly should look toward a more exacting and more critical responsibility in decades ahead. Reasons are obvious, some immediate and objective, others continuing and intangible. Once war has ended, a million or more men and women will return from battle fronts and bases to classrooms, lecture halls, and laboratories in the expectation of securing there some aid in the baffling task of re-establishing themselves in civilian life. Men of letters often enough in recent months have remarked forebodingly that these returning fighters, having lived intimately with "the bright-shining deadly machines" of war, having been impressed again and again with the sleek competency of those machines, will be impatient of anything but cold efficiency. Thus these observers draw none but gloomy conclusions for any other than materially utilitarian education, arguing that emphasis must center more and more on skill in the manipulation and exploitation of physical things, less and less on the ideas which implement appraisals whereby man evaluates himself and his world in the effort to define and to establish the good life.

This is a superficial reading of present events, and may well be scouted as not merely inaccurate but distinctly unjust. Even were it true, more distant and less

sharply definable events are to come which would more than counterbalance it. We shall have, once this war is past, a society relying upon and complicated by technology and technological devices to a greater degree than we now can realize. The economic system under which that society will operate may very probably be radically altered through the influence of these devices and the shifts in commercial value, in concentrations of effort, in permanency of institutions, which they may be expected to induce. The thoughtful man, in contemplating these possibilities, does well to use as his criteria not the likelihood of mass effort to sell multifold streamline gadgets to millions of heedless consuming points in space, but the possibility of sweeping fundamental change in the functional organization of the economic state.

It has been held many times that the good life need take no thought of material things and operating systems developed about them. This transcendental view is interesting, but at least exotic. The good life is not lived in a vacuum, even by philosophers; it must be reached, if at all, in terms of the here and the now. The deep changes that can be foreseen for the decades after this war must therefore be reckoned with by teachers and scholars; it is these changes and their effect both on students who come from war fronts back to schools and on newer generations of students whose lives will be lived in economic and social regions now unmapped which are the incisive reason for self-scrutiny by colleges and universities.

If there is any justification for the gloomy prophecy that the ethical and humane are to be lost from the education of the future, it lies in the implicit admission that the general grasp of ideas essential to the good life has been palpably insufficient in the past. If we have been unable to assimilate pre-war science and technology into our economic and social structure, one argument runs, we have little chance of coping with what the future may confidently be expected to produce. Another version maintains that religion, philosophy, and the imponder-

ables these terms connote have demonstrated inability to fit a man to live happily and uprightly in our times, and that therefore they should be swept out with the rubbish and replaced by some scheme of ergs. Or, others hold, what need has man of intangible considerations, anyway, if he has baths, food, shelter, radio, auto, and so on? Given these latter, he will in time learn to be clean, well fed, warm, amused, and therefore content.

The central jeremiad out of which such arguments are projected is based on a group of assumptions, most of them false. Of the lot, those chiefly conspicuous for falsity are: Man is purely an animal. Science and engineering are fundamentally different from and antagonistic to all other spiritual and intellectual activity. The manufacture of implements, utensils, and glorified toys is the sole purpose, concern, interest, or reason for which science and engineering exist. Education has been given full opportunity and has made full use of the opportunity to explore, expand, and inculcate in men the virtue which is able to recognize and to seek the good life.

The last of these fallacies is rigorously examined in *Liberal Education*, which Mark Van Doren wrote at the behest of the Association of American Colleges. This is a powerful and an often disturbing book, which demands of its reader sincere study emulating the hard thinking which its author has done.

"The better kind [of education] I have endeavored to describe," says Mr. Van Doren in a prefatory colloquy, "is neither easy in itself nor simple to set forth. Education is not a simple subject, as I have discovered to my sorrow. So I have not disguised my presentiment that the task of liberal education is going to be at least as hard as the task of winning a total war. It is the task, for instance, of knowing what to do about science. But that will mean knowing science as even science does not know itself today. The liberal education currently lamented as a war casualty has not been distinguished by the possession of such knowledge. Its successor must be. And there are enough other things that it must be to justify, I

think, the emphasis I have placed upon the need for universal discussion, starting tomorrow, of the ideal college curriculum. Day after tomorrow may be too late."

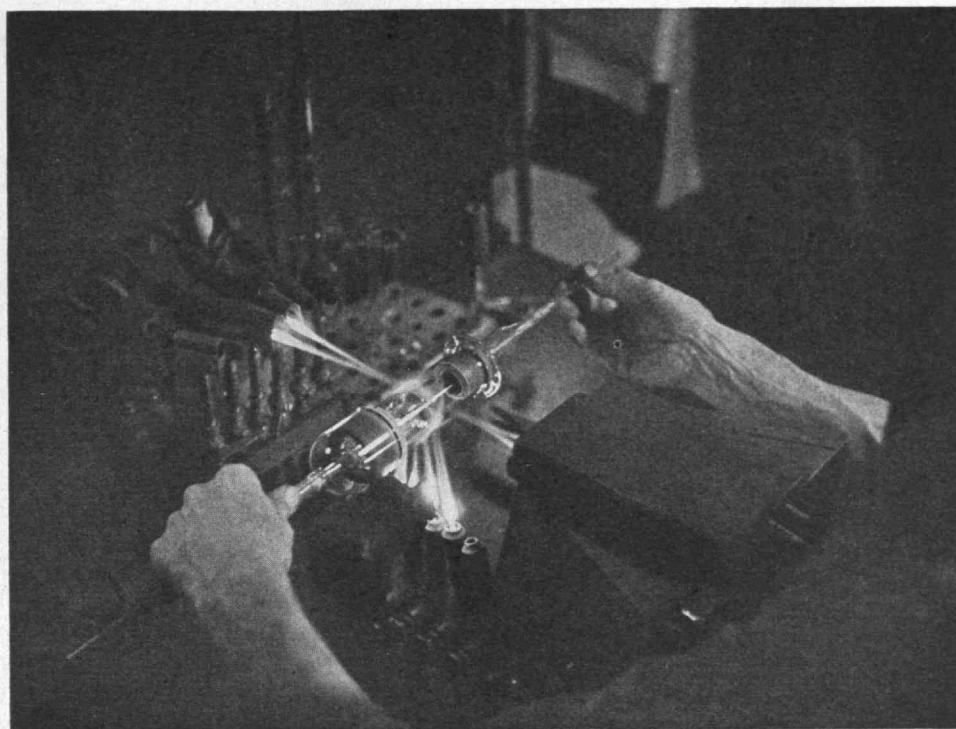
Some of Mr. Van Doren's conclusions will provoke strong dissent; his analysis of the situation of education cannot but evoke admiration. It is penetrating, it is temperate, and it is hardheaded. By it, he is brought back and brings his reader back inevitably and gratefully to the trivium and quadrivium of earlier learning, or to "language" and "mathematics," the inclusive division whereby the seven liberal arts become two great disciplines — the first distinguishing the kinds of things, the second handling their quantities. The muddled state of education as we know it arises in part because though the second group of studies preserves the precision which both groups once conspired to promote, the two groups no longer penetrate each other; in part because education has allowed the arts of the trivium — grammar, rhetoric, and logic — to degenerate; and in part because in the Seventeenth Century, "when the new science developed the quadrivium as an exclusive discipline . . . language (or literature) and mathematics (or science) became . . . enemies. . . ."

The essence of the problem, then, as Mr. Van Doren's analysis suggests, is to regenerate the arts of the trivium, restoring to them the intellectual rigor which is as much their birthright as it is that of the quadrivium, and to re-establish the right relation between the two great groups. What do these prescriptions mean? Answers to this question may be had on any level desired. One is implicit in the fact that a poet writing profoundly and ably about man in the *American Scholar* embeds the ancient fly of "different than" in the amber of his verse while a botanist in the same week argues in *Science* that descriptive words such as "abundant," "common," and "scarce" should be given agreed relative values in order to assure that publications shall be precisely comprehended.



A slag stream strikes a brilliant right angle . . .

*... which glass, flame,
and a craftsman's hands
recapitulate.*



Richard W. St. Clair, '36

The problem is of especial interest to such institutions as schools of science and technology. One of them, at least, in students, staff, and alumni, would take exception to Mr. Van Doren's statement that "the curriculum is not something which it is fashionable to ponder." To these institutions, the dilemma of liberal education is of perhaps greater concern than it is to any others. They are the wardens of the quadrivium, and must before all others see to it that the studies of the quadrivium are mature in the full sense. They must, too, seek to restore the right relation between quadrivium and trivium, and therefore it is of extreme importance to them that the trivium once more assume its full status intellectually. In a world where increased technologies will call for increased humane and ethical sense, these schools as sources of technological advance and as teachers of the men having chief responsibility for the advance and for the utilization of the advance in the lives of the people, must stake everything on strengthening the general concept of virtue to meet the added demands which will be placed upon it. They therefore must agree with Mr. Van Doren that the arts of the quadrivium, "following the arts of the trivium as they do . . . are subject to them as all other arts and studies are, and cannot afford to forget the fact." Aristotle held that the trivium is "concerned with such subjects as fall in a sense within the cognizance of all men. . . . We are all in a sense dialecticians and rhetoricians; for everybody essays up to a certain point the criticism and support of a thesis, defence and accusation." The revitalized and earnest study of the universals — essentially the prime reason of both trivium and quadrivium — is the center of the target.

The scientific and technological schools of the United States are anomalies in one way: Each is partly a college and therefore a center of liberal education; each is partly a center of specialized professional study and therefore a university. Their work during the past century has met the pragmatic test successfully; the dominance of America in a score of scientific, technological, and in-

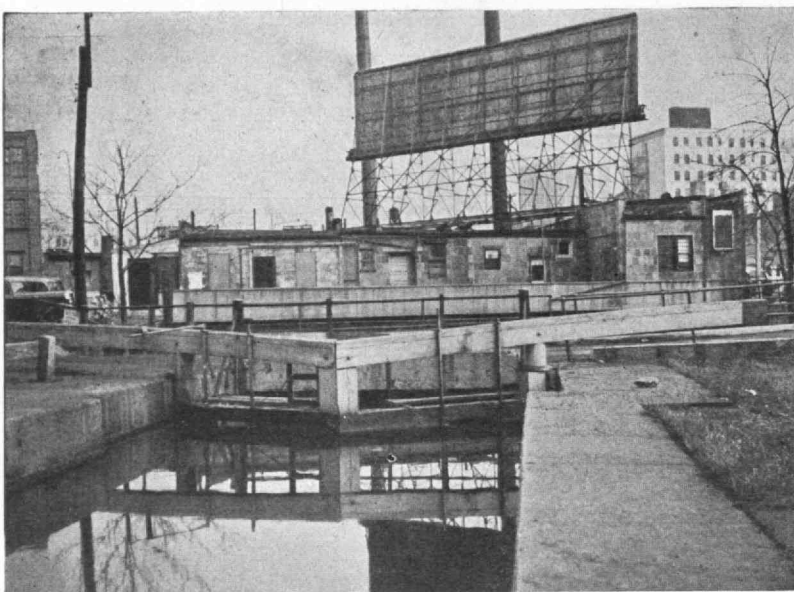
dustrial fields is in itself evidence enough. Beyond it, in a principal segment of our people are qualities of thought and approach directly attributable to the rigor and the integrity of education in science. But these schools would be the first to declare the pragmatic test insufficient and to agree in the necessity for the thorough-going reassessments which Mr. Van Doren urges.

The result, for these schools, can take two forms. One will be a greater co-operation with liberal arts colleges, through, for instance, wider use of the plan whereby a student spends three undergraduate years in the college, and two in the scientific school. The optimist will characterize this as cool recognition of comparative advantages; the pessimist, as easy abnegation of responsibility. Another form which the result may take will be unswerving revaluation of present curricula, seeking reorientations of energy and reallocations of time in order to make the restored arts of the trivium an integral part of the student's better intellectual and spiritual life.

Here is work to be done. Doing it ill may bring a truce and a prolongation of specious placidity, but can end only in disaster. Doing it well will give to teachers the reassurance of knowing that rarer among their graduates will be the citizen of Mr. Van Doren's legend, "who wakes up at forty to find himself going through a routine the meaning of which he has never known, and the value of which he now may doubt."

Specifically

THE announcement that British and American engineers have developed a successful, high-speed, jet-propelled plane was greeted by the press, as it should have been, with a fanfare of comment. While not unexpected, and presaged by the flight of the Italian Caproni-Campini plane in 1940, the event is an engineering milestone. But in spite of the fact that a brief statement on the principle of operation was contained in the releases, many of the commentators lost their



bearings somewhere between rocket and jet propulsion. Even the *New York Times* carried an editorial titled, "The Rocket Plane Is Here." "Evidently," began the editorial, "the astronauts who dreamed of kicking themselves from the earth to Mars were not mad." They would have been had they considered using any such ship as the newly announced development which is now being tested by Allied airmen.

In a very real sense, all vehicles using propeller, jet, or rocket propulsion are driven by jets. All move forward because they throw backward a blast of air, gas, or what have you. Specifically, however, the jet-propelled planes referred to by the military authorities form their jet by taking in large quantities of air at or near the nose of the plane; compressing it with ducts, compressors, or both; heating the compressed air by burning fuel, which need not be of any particular octane rating; and finally expanding the heated air through a large nozzle, from which the gases issue with far greater speed than they had on entering the plane. The reaction to the ejection of the gases drives the plane ahead. Since the oxygen which burns the fuel comes from the entering air, the plane would be as helpless as a propeller-driven craft were it to leave the atmosphere.

A rocket ship, on the other hand, would carry its own oxygen supply and would indeed be sufficient unto itself even in interstellar space. Present fuels containing their own oxygen, while capable of furnishing large amounts of power for short periods of time, must be greatly improved in efficiency before they can drive planes for important distances. Perhaps some of the more pessimistic reactions had this form of drive in mind.

Catching Up

SO swift has been its development that for the airplane to be farther advanced than the airport at which it lands is not surprising. And as war has spread the aeronautic net over more and wilder parts of the earth, the discrepancy has for a time grown greater. Steel mats which are spread out on the ground for swift preparation of landing strips, and the use of soil cement for the same purpose are but two of the immediate answers to the military phase of the problem.

Another, possibly of greater civilian interest for the future, is the packaged airport — an assemblage including not only all power and electrical apparatus, radio equipment for communication between the airport and planes or between the airport and other airports, lighting equipment, and meteorological instruments, but also prefabricated buildings for administration, living quarters, hangars, and offices, complete with heating, plumbing, and sewage-disposal systems.

As described by the *Westinghouse Engineer*, the packaged airports are built in four sizes and are also designed for three sets of temperature conditions: polar, temperate, and tropical. Moisture, wind, ice loading, temperature variations, insects, and other climatic factors are reckoned with in the engineering of the special types in each of the four sizes. Twelve types of main terminal buildings, for instance, are available.

The largest of the four outfits is designed to equip a feeder airport located in a fair-sized town on a main airway. Next down the scale comes a feeder airport calculated for a smaller community, perhaps on a branch air line. Third is one suitable for use at isolated mines, ranches, or industrial developments. Fourth is essentially equipment for an emergency landing field, comprising the minimum essentials to care for a plane that has been forced down.

When Electric Lights Produced Myths

BY FRED C. KELLY

AFTER Charles F. Brush had invented the first practical electric-light apparatus — publicly demonstrated only a little more than 65 years ago — the revolutionary invention was received with almost the same unawareness of its importance that greeted the Wright brothers after their world-shaking achievement at Kitty Hawk a quarter of a century later. About all that anyone believed about electric lighting was something that wasn't so!

The first arc light and dynamo actually sold went early in 1878 to Nicholas Longworth, whose son was later speaker of the House of Representatives. It was exhibited from a balcony of the Longworth home on one of the principal residential streets of Cincinnati; and as it



was of 4,000 candle power, it attracted a large crowd. Brush, its inventor, had gone to Cincinnati from his home in Cleveland to show how the outfit should be operated, and he was purposely in the crowd to hear comments. Many were there of the type who, if they know nothing about a subject and find others who know nothing about it either, will promptly start to explain it. In describing the scene afterward, Brush told of one man whose talk had attracted a considerable audience. This man called attention to the part of the apparatus at the top of the lamp and said, "That is the can that holds the oil." Then, referring to the side rod, he added, "And that is the tube which conducts the oil from the can to the burner."

The idea that the electric light depended on oil persisted for a long time. And there were plenty of other myths.

When one of the earliest of the four-light machines was exhibited to a number of guests at the plant of a large manufacturing company in Cleveland, one man looked at the apparatus carefully for a long time and then asked the inventor, "How large is the hole in that little tube that the electricity flows through?"

One of the frequent arguments raised in all parts of the country against the new lighting was that it would ruin people's eyesight. Everyone stared directly at the brilliant arc and then complained that it was too dazzling.

"This will never do," people said. "After you look at it, everything else looks dark. We'll ruin our eyes."

To which Brush calmly retorted: "The same objection may be raised against using the sun for lighting purposes. If a man is determined to ruin his eyes by staring at too bright a light, why doesn't he stare in the same way at the sun?"

Perhaps the public had some excuse for such nonsense, for even well-known scientists had promoted foolish beliefs. As late as 1873, Deschanel's *Natural Philosophy*, a well-known textbook, said: "The light of the voltaic arc has a dazzling brilliancy, and attempts were . . . made to utilize it. The failures of these attempts were due not so much to its greater costliness in comparison with ordinary sources of illumination, as to the difficulty of using it effectively. Its brilliancy is painfully and even dangerously intense, being liable to injure the eyes and produce headaches."

Valuable today as a means of supplying cooling water to Akron industrial plants, the Ohio and Erie Canal still performs important work in the world though it long since outlived its usefulness as a means of transportation. From the variegated photographic record assembled by C. E. Patch, '02, here are, starting at the left, the lower gate of Lock 1, Lock 2 and the old dry dock, and the crumbling arch of the old power sluice which put canal water to work industrially. De Witt Clinton formally broke ground for the Ohio and Erie Canal on July 4, 1825, and two years later the waterway was completed, connecting Akron and Cleveland. So successful was it that in 1840 a canal was constructed connecting it with the Ohio River at Beaver, just below Pittsburgh. The undoing of the canals as arteries of trade was the coming of the railroads; the Cleveland and Mahoning Railroad secured a controlling interest in the Ohio and Pennsylvania Canal in 1854; by the mid-Seventies, that waterway was serving only to carry water to a millrace which had been built some decades earlier to supply power to local enterprises. The Ohio and Erie itself continued in operation later; even as recently as 1906 appropriations were made for repairs to it. During a flood in the next decade, some of its 41 locks and gates were dynamited, however, and as a canal the system was a dead thing. The water in the upper sections and the lakes which feed them continues an industrial asset.

People did stare at the brilliant arc light and the fact that they did so was used for a long time as an argument against electric lighting. One reason they stared was that they wondered where the light really came from. They thought there must be some trick to it. Surely the electricity, or the light, came from oil, but where was the oil supply?

When the first public street lighting in the United States — in the Public Square at Cleveland — was turned on in April, 1879, hundreds of people among those who flocked to the square carried colored glasses or smoked glass, as if to witness an eclipse of the sun. It was a gala night; but when everyone discovered that there was no blinding glare nor any harm to eyesight, disappointment was general.

The street-lighting idea soon spread to other cities. Broadway, New York, was first lighted from 14th to 26th streets, and a few weeks later this circuit was extended to 34th Street. Neither the new street lights nor Charles F. Brush was popular with corporations that sold gas, and they did all they could to discourage use of the new invention. They might have done more harm than they did if Brush had not quietly explained to them, in a convincing way he had, that they were wrong, even from a selfish point of view, in fighting electric lights.

"Electric lights will *increase* rather than decrease use of gas," he predicted. "People have been living in darkness so long that they have organized their lives on that basis. After seeing brilliantly lighted streets and stores, they'll want more light in their homes. As they use more gas for lighting, you can make gas cheaper and that will open up almost limitless industrial uses for gas."

Another early difficulty was that users of electric-light outfits could not be induced to let them alone. This was especially true when a lighting apparatus was sold to a city for street lighting. Some employee in charge, mechanically minded, would at first be curious and then would wish to "improve" the device. Nearly every workman thought he knew more about the mechanism than the inventor did. Complaining of a lamp that had not worked properly, one man said, "Why, I've had it all apart four times and still it doesn't work." Tinkering with the lamps threw them out of order, and then the inventor got the blame. No matter what the reason, if the lamps

didn't work and the news became widespread, the business would be wrecked. Brush knew he must make the mechanism as foolproof as possible. So he put it together without screws or bolts of any kind which could be taken out and lost. All necessary adjustments were made at the factory when the lamp was tested, and then the parts were riveted in a way to make further meddling impossible. They were not only riveted together but were assembled a little in the manner of a Chinese puzzle.

The high-tension dynamos for series lighting which came along later did not suffer so much from tinkering because, as Brush used to say, they were so powerful, so able to look out for themselves, that they discouraged familiarity.

Much trouble was caused by trivial accidents and the lack of trained men to install or operate lighting plants. Since commercial electricity was just starting, naturally few experts were available to whom Brush could delegate important work, and he himself used to go around straightening out trouble. Once he traveled 1,500 miles to take a common, double-pointed tack from the bottom of a dynamo where it had caused a short circuit. Occasionally damage appeared to have been done maliciously, possibly by someone who disliked the mechanism because he was unable to understand it.

Perhaps it was his experience with human beings in the early days of electric lighting that made Brush feel sure, all the rest of his life, that the human race needed improving. This may have been a chief reason why he created the Brush Foundation, to promote research looking to "the betterment of human stock, and toward the regulation of increase of population."

"Quick, Henry, the . . . !"

AMONG such sentimentalists as fathers and football fans, the process of metalizing, or spraying a coat of atomized metal onto some surface, is fairly familiar because of its having been used to give a sort of immortality to the wrinkled shoes of Junior's infancy or the battered pigskin of Siwash's state title. The values of the process as a means of engineering economy and industrial thrift, however, are much more in the news nowadays, as sprayed atomized metal is used for correction and repair to save machine parts from the scrap pile, to build up components which have been worn beyond permissible dimensional tolerances, to deposit material of desired physical characteristics on a less costly base material, or to deposit physically weak materials on base substances possessing greater strength. The first of these uses are especially of interest at present in so far as they help to meet difficulties arising from the shortage both of machine tools and of skilled labor.

Fed either as wire or as powder into a gunlike instrument designed for the purpose, the metal to be deposited is melted by a fuel gas such as propane or acetylene and, once molten, is atomized by a jet of compressed air. The jet carries the minute particles of atomized metal from the nozzle of the gun to the surface of deposit at such high velocity that the particles flatten out into infinitesimal flakes as they strike the surface. The work to be coated is rotated, or the gun is traversed over it, so that thorough coverage is effected. Thickness of the deposit of course depends on the number of rotations or traverses and can be built up as desired on properly prepared

surfaces. The coating thus deposited consists of layer after layer of minute flakes overlying each other much as do the scales of a fish or the shingles of a roof, and held together by cohesive force.

Loom rolls, crankshafts, bearing journals, press rams, and similar parts which have become worn are salvaged by the application of metal coatings of appropriate properties. The metalizing process is also being used to deposit corrosion-resistant coatings as protection against the effects of chemicals and heat. Extension of the idea of atomizing materials for this kind of application is under way, organic coatings such as rubber and various resins being utilized experimentally.

One More for the Menu?

IT doesn't take much of an economist to realize that a beverage which succeeds in tantalizing the palate of a public with a high standard of living can become not merely a big but a huge business. Coffee, cocoa, and tea are the mainstays of dozens of tropical countries and normally are major elements in world trade. The United States, for example, imported 2,055,065,000 pounds of coffee in 1940. Were this country's coffee imports to cease, depressions ranging from the severe to the catastrophic would strike Brazil, Colombia, Guatemala, Venezuela, El Salvador, Nicaragua, and Costa Rica. England plays a somewhat similar role in relation to tea.

In maté (pronounced "mah'-tay"), Brazil, Argentina, and Paraguay have another candidate for the bottom lines of American and European menus. Maté is a tealike, caffeine-containing beverage made from the dried and ground leaves of a South American holly tree. Much of the crop, which must already be controlled to prevent overproduction, is from wild stands of these bushy evergreens, which at first glance resemble orange trees.

Some 12,000,000 South Americans, most of them in the three main producing countries and in Chile and Uruguay, consume almost 400,000,000 pounds of maté yearly. Imports into the United States, however, amounted to only 82,700 pounds in 1940 and were said to be about 2,000 tons last year. This latter figure is about equal to the consumption of tea in Great Britain during 1745 (incidentally, 80 per cent of that amount was smuggled in).

As the largest exporter of maté, Brazil is naturally interested in tapping the greatest potential markets for this and virtually any other luxury beverage — the relatively well-to-do populations of North America and north Europe. Europe has other things on its mind, but Generoso Ponce Filho, a director of the National Matte Institute of Brazil, is at present in this country for the purpose of initiating advertising campaigns and otherwise promoting the use of maté. The stated goal is a comparatively modest 20,000 tons a year. This is all very well, but in view of the manner in which coffee and cocoa have attained popularity, it would seem that Brazil is missing a bet in not putting Carmen Miranda on the committee.

Tesserae

ONE gram of radium from 370 tons of pitchblende is the reported production from the radium-bearing and silver ores mined at Echo Bay on the east side of Great Bear Lake in the Northwest (*Concluded on page 232*)

The Rubber Situation

Establishment of a New Major Industry to Win the War Means a New Productive Factor in the Years of Peace

BY BRADLEY DEWEY

SUBSTANTIAL completion of the program of construction of plants for the manufacture of synthetic rubber, which was a major result of the epochal report of the Baruch Committee in September, 1942, will have been attained in the first quarter of this year. It will be late summer before the low point of our stock pile of crude and synthetic rubber is reached. The occurrence of these two events so close together should make any thoughtful American pause a moment and ponder.

In the achievement of the synthetic rubber plant program, we are bringing into existence in a little over two years an entirely new chemical industry, which is valued at three-quarters of a billion dollars and which in peacetime would have taken at least 15 years to develop. In coming to the low point of our stock pile — a point which, for natural crude, is somewhat below the reserves which the Baruch Committee's report declared to be the irreducible minimum — we have both a new demonstration of the close interrelationships existing among the materials and processes of a technological civilization and a new incentive for the application of every ounce of effort

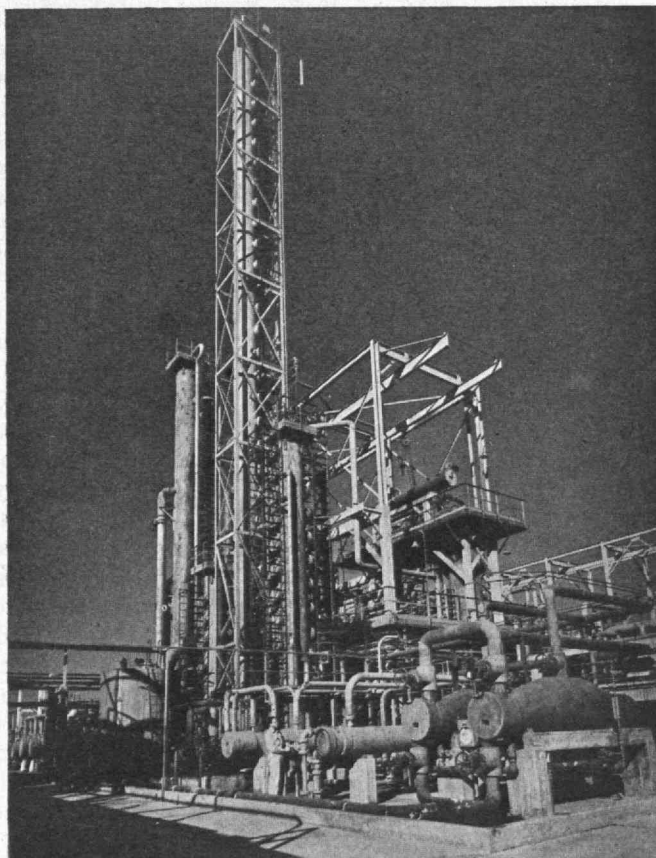
and conservation to see us through 1944 until production from the newly completed plants and improved manufacturing technique begin little by little to help fill the gap.

The decrease in crude rubber reserves, which full-scale production by the entire synthetic production setup should by degrees overcome, results in part from larger requirements of the armed forces for heavy-duty, combat, and airplane tires as a result of changing war conditions; in part from man-power shortages which made it difficult during the latter part of 1943 to man even existing equipment; in part from added demands imposed by the economies which circumstances enforced upon us a year ago. Add to these the fact that stocks of crude rubber, limited at best as a consequence of Pearl Harbor, have had to be tapped excessively for the construction of airplane tires and certain types of heavy truck and bus tires which cannot now be made satisfactorily of synthetic rubber except in conjunction with rayon tire cord. We have been and are short of rayon cord, and as long as we are, a greater degree of conversion to synthetics for these tires remains improbable.

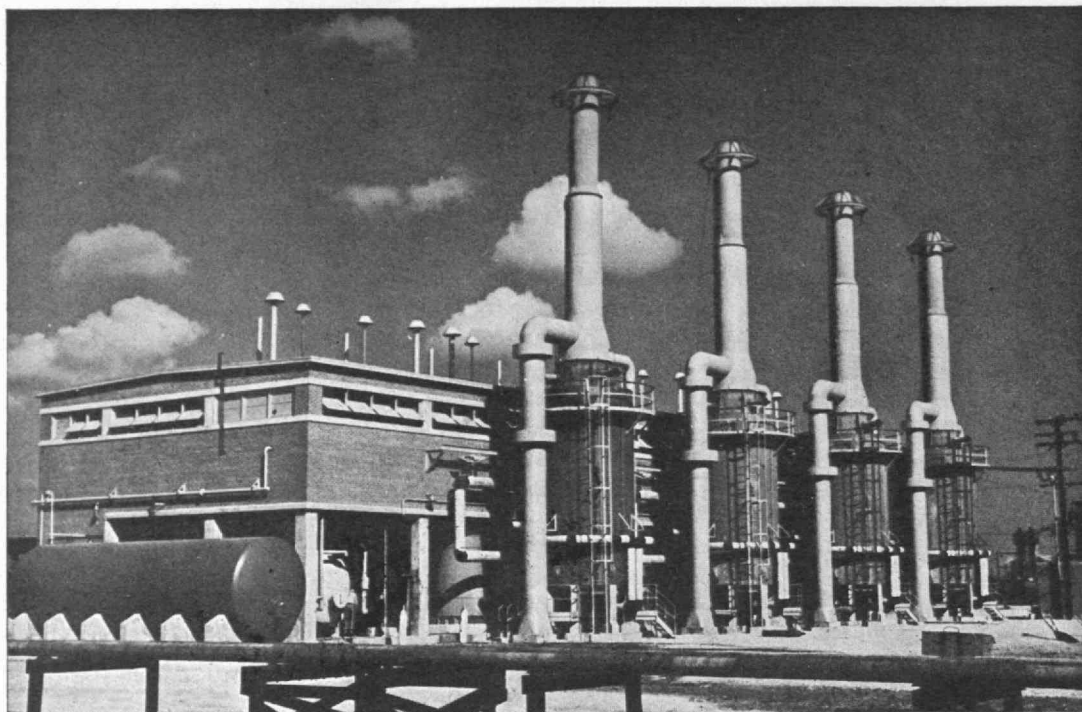
What is the resultant of this situation? Simply this: (1) Our armed forces will have what they need. (2) Much of the civilian transportation burden for a long time yet to come must continue to be carried by recapped tires. (3) The rubber production program has successfully met the problem which had us worried in 1942: "Can enough rubber be produced before the crude rubber stock pile is exhausted?" (4) Since for a multitude of reasons, some of which will be discussed later in this paper, the strictest conservation will for a considerable time be an imperative necessity, the careful driver must continue conscientious co-operation and the careless driver must change his habits or stop driving.

Installations which have been brought into being during the past year and a half for the manufacture of synthetic rubbers and of their principal raw materials, butadiene and styrene, have a rated capacity of 850,000 long tons a year. This figure is 79 per cent of the capacity which Dr. Compton, Dr. Conant, and Mr. Baruch recommended in their report as the optimum for the United States and Canada. It is 50,000 tons more than 1941's consumption of rubber in the two countries, the highest on record. The imports of natural crude for 1943, totaling some 60,000 long tons, are expected to be increased by about 20,000 long tons this year. Hence in terms of past use of rubber, little trouble or skimping is to be foreseen.

But though there need not be trouble, there must be skimping, as far as anything but essential driving and other essential use of rubber is concerned. If we were living in time of peace, we should as a result of the amazing efforts of the country's chemical and engineering industry be very well off. But we are living in time of war, and



Controlled complexity — butadiene extraction plant of Standard Oil of Louisiana at Baton Rouge, showing a butadiene rerun tower



An ethyl-benzene dehydrogenation plant of the Dow Chemical Company at Velasco, Texas

ordinary expectations do not apply. Our needs are now far larger than they were in the 800,000-ton year of 1941, because of military requirements, because of depletion of inventories, and because of the necessity of helping our allies.

Military requirements are outside this discussion; it is enough to say that they will increase rather than lessen. So also with tonnages that must be supplied to others of the United Nations. What depletion of inventories means can readily be stated in terms of passenger car tires, however. Before December 7, 1941, about 55,000,000 new tires were distributed each year. In 1942, that figure was slashed to 4,700,000. In 1943, the total was 17,200,000. But these tires were the equivalent in service of but about 12,000,000, for they included war tires made of reclaimed rubber, used tires recovered from the collection made in 1942, and over 2,000,000 emergency tires serviceable for short distances. By the end of this year, the country will have been on a starvation diet for three years, so that the 30,000,000 tires which should be distributed during 1944 cannot be expected to relieve all difficulties. In this passenger car tire situation, then, is summarized one cogent reason why we shall continue to be confronted by necessity for strict thrift despite the phenomenally swift development of the synthetic rubber program.

Truck and bus tires present another problem. Overloading and, too often, higher than recommended speeds have taken a serious toll of these tires, so much so that new tires cannot be produced in sufficient quantity in the immediate future to prevent an extension of the present shortage. It is not the supply of synthetic rubber that will limit the making of large-sized tires, but the problems of conversion, the shortage of man power, the shortage of high-tensile rayon cord, and the lack of adequate facilities in the industry, such facilities as mills, calenders, tire-building equipment, vulcanizers, and special large molds. The specific needs of our armed forces are very strongly felt in this field, for the principal increase in military requirements during the past six months has been for large

tires for combat vehicles, landing craft, and airplanes. The manufacture of these not only requires substantially greater quantities of rubber, tire cords, and other components but has imposed on the industry the necessity of obtaining new production equipment and has accentuated the man-power problem.

As was to be expected, the Gargantuan new plants for the manufacture of synthetic rubber or its components have encountered varying degrees of difficulty in starting up. They are part of a new industry which, because of the urgencies of war, had to start from scratch. In general, there has not been time to test processes in pilot plants prior to construction, or to go through many other of the conventional preliminaries. The resourcefulness of the chemical and engineering industries of the nation, however, has been more than sufficient to overcome problems as they arose, and as fast as they arose. Consequently, synthetic rubbers in increasing quantities are being delivered to rubber manufacturers for conversion into rubber products.

As these new synthetic supplies became available to them, rubber manufacturers have been confronted by a problem of reconverting their plants for the production of the goods which they used to make and from which they had turned to the making of different products when Pearl Harbor cut off their regular flow of raw materials. Pre-war facilities and equipment which had been left in place during that change-over are now insufficient to meet the new demands. In addition, synthetic rubber thus far has required additional machinery and longer processing time than does crude rubber. The industry consequently set out on an expansion in plant and facilities calling for the investment of over seventy million dollars of its own capital. The majority of this expenditure will be for expansion of existing plants rather than for the construction of new plants.

Since recapping must carry the burden of transportation for some time to come, it is most fortunate that the reclaiming and recapping parts (*Continued on page 212*)

Printing Press vs. Tyranny

Underground Publications of Occupied Europe Strengthen Morale and Stiffen Resistance to the Nazis

BY DOUGLAS C. McMURTRIE

THE printing press has, during more than 500 years since its invention, done much to further the cause of human liberty. But it has never performed a service more vitally important to the cause of freedom than it is rendering today in strengthening the morale of peoples in the occupied countries of Europe. In these nations, temporarily under German domination, patriots with fervor and determination seldom equaled are publishing hundreds of underground newspapers, in flagrant defiance of the Nazis' usually efficient Gestapo. This flame is one the Germans have proved powerless to extinguish.

So a free press still exists in Europe, though maintained at great human cost.

With newspapers here screaming such headlines as "Berlin Afire After Biggest Raid," "Reds Gain in Drive," and "Allies Smash German Lines," it is little wonder that almost no notice is taken of the steady, unrelenting fight against the Nazis on the publishing front. Except for brief items occasionally used as filler, the heroic drama being staged by the underground press of the occupied countries is a more or less silent episode in the struggle for victory and freedom.

The secret press should not be underestimated. While its exact accomplishments are difficult to appraise, it is certainly the principal force in maintaining the spirit of the conquered peoples and in stiffening resistance to the enemy. What it has done toward organizing effective sabotage and revolt is already known in many instances. Its work in co-ordinating active aid and in preparing the ground for invasion day will be better known in time to come.

It is easy to understand why the activities and inner workings of the underground press have been so meagerly publicized. Secrecy is of the essence of its operation, and general knowledge of its who's, why's, and how's would result in wholesale executions and would handicap an already perilous undertaking to the point where continued operation would be almost impossible. Hence the personal sagas of these unsung heroes will have to wait until the war's end before they can be told.

In the meantime, a not inconsiderable store of general information on the subject can be revealed. Of major interest is the number of clandestine newspapers which flourish under the nose of the Gestapo. Taken in the aggregate, somewhere near a thousand publications — ranging from mimeographed sheets and circulars to full-fledged printed newspapers — are distributed in the occupied lands. Leading the field numerically are France, Poland, and Belgium, each of which has between one and two hundred regularly published papers and news-sheets. This number scales down through Norway, Czechoslovakia, Yugoslavia, Holland, Greece, Denmark, and little Luxemburg, the last of which has at least three known clandestine newspapers. Even the Axis

satellites have their dissenting factions which give vent to their sentiments through secret publications, and Germany itself harbors some antinazi groups with their respective organs. Taking them as a whole, and taking even some of the publications individually, one is amazed that so much printing equipment and paper has been acquired under the alert Nazi eye. If all issues of the secret publications that have been printed since the New Order began its program of social and economic enlightenment were laid end to end, they would supply the Austrian paper hanger with enough material to keep him busy throughout eternity.

Credit for being the first underground newspaper to make its appearance in defiance of the Nazis is due the Czechoslovakian *V Boj*. This was the organ of Josef Skalda, who, after an extended period of successful operation during which he welded the Czechs into a potent unit of resistance, finally was captured by the Gestapo in the basement of a warehouse where the paper was



Belgian Information Office

Best known of all underground newspapers is *La Libre Belgique*. Published throughout World War I, it is now appearing in a second incarnation. Peter Pan is named as editor; the office of publication is stated to be in the building which serves as headquarters for the German occupation authorities.



United Nations Information Office

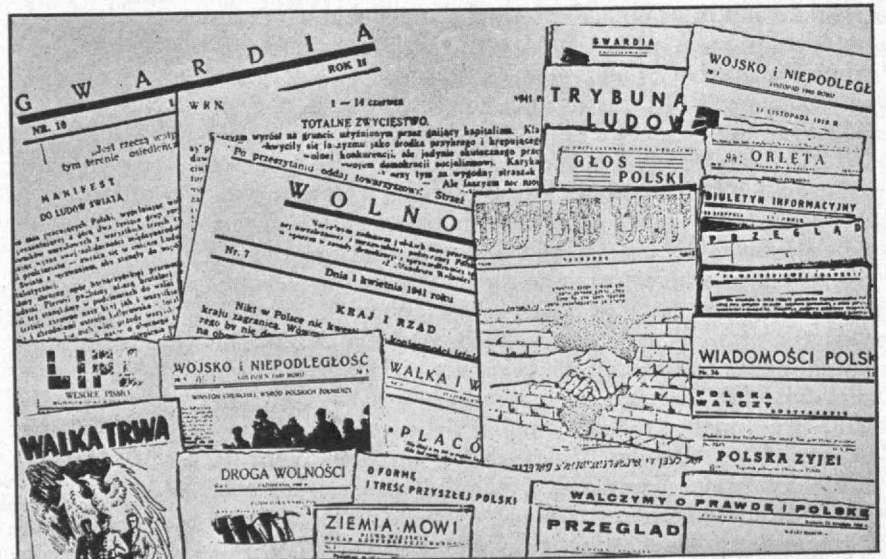
A group of French underground newspapers which proclaim eloquently that in France the spirit of freedom is not yet dead. Shown prominently is the pioneer yet short-lived Valmy. The names of others are appropriate: Humanité, La Voix de Paris, L'Ordre Nouveau, Liberté, Peuple de France!, Pantagrue.

being produced. After undergoing German torture and abuse in prison for some eight months, he was finally executed and today his memory is revered by Czech people, who have made him a national hero.

The French paper *Combat* leads the clandestine field with a circulation which in 1943 was estimated at 220,000 copies, divided among three editions and issued monthly. One edition is for the whole of France; a special edition is printed for the Lyon district; and the third, numbering about 40,000 copies, is for circulation in North Africa. Another French paper, *Libération*, is credited with 180,000 copies an issue. One is a weekly edition, published in the occupied zone, and the other is a biweekly affair distributed in the Vichy territory. Two others, *Le Populaire* and *Le Franc-Tireur*, boast circulations of 30,000 and 15,000 respectively.

The clandestine press of Holland is led by *Het Parool*, *De Oranjekrant*, and *Vrij Nederland*. Each has a cir-

Underground newspapers published by fierce patriots flourish in conquered Poland. Here shown is a group of clandestine Polish papers. At the left is *Lipa*, exclusively a humorous paper poking fun at Hitler, Goering, et al., at the risk of its editors' lives.



United Nations Information Office

ulation estimated at between 10,000 and 20,000 and readership which is reckoned as more than 100,000.

Belgium's famed *La Libre Belgique* of World War I has reappeared in the present conflict and prints an estimated 40,000 copies in three editions — one in Brussels, one in Liège, and one in Namur. It was the publishers of this paper who in the first World War managed to have a copy of each issue placed on the desk of the German governor general of occupied Belgium. And at that time no amount of German supersleuthing discovered how the paper made its mysterious and regular appearance. Not until after the War was the fact revealed that the aged charwoman who cleaned his quarters was the culprit who placed it there. Today the No. 1 copy of each issue of *La Libre Belgique* is reserved for the governor general and is delivered to him, not so impudently but just as effectively, through the mails. Coincidentally, the present governor general, Baron Alexander von Falkenhausen, is a nephew of the Baron Ludwig von Falkenhausen who filled the same post in World War I. Also, Paul Jourdain, a son of the Victor Jourdain who was the mentor of the first *La Libre Belgique*, is understood to be connected with the current publication. Thus the enmity of both parties is of a personal as well as a national nature.

With torture and death the common occurrences they have become in the nazi scheme of things, such an end has almost come to be expected as penalty for defying the Germans. The operators of underground newspapers are given priority on this black list, and to them belongs the dubious honor of being the most sought after by the Gestapo.

Poland has perhaps borne the brunt of nazi cruelty and there, according to reports, persons associated with the secret press have been subjected to the most merciless treatment. Hundreds have been summarily executed for the crime of being "suspected" of underground activity, after having undergone agonizing tortures in attempts to make them confess their guilt and divulge the names of their associates.

The Polish information service reports an instance in which the staff of a secret paper, including some women, were surrounded in a house and ordered to surrender. Knowing their certain fate, they refused. They barricaded the doors and windows and prepared to make a fight-to-

the-finish stand. They did. For a while they traded shots with the Nazis, who soon tired of warfare on such an equitable basis and tossed a few grenades into the building. They then crept up and set fire to the house, cremating all the devoted members of the underground paper's staff who were inside it.

On another occasion, the anniversary of Hitler's assumption of power, says the Polish agency, the German commander at a prison in Poznań staged a celebration in honor of the event. The highlight of the entertainment program was a "hunt in honor of the Fuehrer." This unique example of nazi sadism consisted of turning a number of prisoners, including some secret-press workers, out of their cells and ordering them to run up and down the corridors while the drunken Nazis shot at them. Nine prisoners were killed in the "hunt," and several who were wounded were given the *coup de grâce* after the revelers turned to other amusements.

While these are isolated incidents and probably represent the peak of Nazi brutalities that have come to light, in no place have the Nazis been known to look tolerantly on underground press activity, with the possible exception of Denmark. In general, the long prison terms, the tortures, and the executions of Poland can be matched in France, Belgium, Norway, Czechoslovakia, and the other subjugated nations. Although connection with the secret press carries with it such great risk, there is no lack of volunteers to fill the ranks as they become depleted through captures.

It should be noted that Denmark, at least until the widespread revolts and sabotage there several months ago, was the fair-haired child in the Nazis' adopted family. It was selected as a model of what could be done under the New Order; so the Danes enjoyed the rare privilege of being permitted to call their souls their own and partake of other German munificence. In contrast to the other occupied countries, they were permitted comparative freedom of the press; news was subject to less suppression, and the few underground papers confined their columns more or less to exposing quislings and listing the names of Danish girls who were consorting with German soldiers. When caught, the clandestine newspapermen were usu-



United Nations Information Office

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ΕΚΔΙΔΕΤΑΙ ΑΠΟ ΤΗΝ ΠΑΝΕΛΛΗΝΙΟ ΕΝΩΣΙ ΑΓΟΝΙΖΟΜΕΝΩΝ ΝΕΩΝ

Ἄριθ. φύλλου 2 — Ἀθῆναι Ἀπρίλιος 1942

27 ΑΠΡΙΛΙΟΥ 1941 - 27 ΑΠΡΙΛΙΟΥ 1942

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United Nations Information Office

The title of this Greek underground paper translates as Glory, which is what the Greeks are once again contending for, with a daily share accruing to their heroic editors and printers. This and other Greek papers are printed from type.

ally punished with prison terms ranging from 30 days to two years, depending on the magnitude of their paper's offenses. The Danes' actions indicated, however, that they found the abundant life under the nazi plan so short of abundance that they preferred to live in their old, humdrum, unenlightened style.

Paul Simon's escape to England and his subsequent report of the many difficulties and obstacles encountered in publishing the French secret paper *Valmy*, have given to that newspaper a large share of the clandestine press limelight. The story of how Simon and three others began publication of *Valmy* — one of the first secret-press efforts in France — with a child's toy printing press, and how they later developed the venture into one of France's most important resistance organs is familiar to many. The experiences of *Valmy*. (Continued on page 216)

In small yet heroic Norway, underground editors have faced difficulties which many others would have considered insuperable. But the flame of Norwegian patriotism cannot easily be quenched. The publication showing the coat of arms is simply entitled We Love Our Land. The others are named Freedom, Home Front, and Forward.

America's New Frontier

Concerted Effort Is Essential for the Successful Solution of Problems of Replanning and Reconstruction

BY WALTER R. MACCORNACK

OUR American cities are headed toward bankruptcy. Indeed some of them are bankrupt already, and continue in existence only because they have the power to levy higher and higher taxes and thus are able to keep going on an unsound economic basis. We have seen them decline to this sorry condition within the last quarter century because of lack of interest, lack of understanding, and lack of united effort to prevent their decay.

Though we have boasted that our standard of living is the highest in the world, the fact is that a mere decade ago we had almost fifteen million people unemployed, one-third of our population living in homes unfit for human habitation, and more than one-half of our population earning incomes too low to provide decent shelter at the then prevailing cost of producing that shelter.

We are inclined, and rightly so, to speak with pride of the high level of civilization which exists in our country. But what can we say of that civilization when the cost of crime is reckoned at a billion dollars a month — a rate which in a quarter century would pile up a sum equaling the total cost of the present World War?

These gloomy statements are not made simply for the sake of gloom. They are made because they are important, because they are closely related aspects of a single problem, and because the solution of that problem will call upon traditionally American characteristics. That the problem must be solved if we are to see continued the kind of life for which this war is being fought, there can be no doubt. And working out a proper solution to it can be counted on for material assistance in bridging the perilous gap between war and peace.

We have come to the end of the type of physical development that faced the founders of our country — the mastering of a continent, or, as the phrase runs, the conquest of the frontier. But though the vast areas of the continent have been made useful for human existence, though our natural resources have been skillfully developed, we still face a frontier, and one that will call upon the very qualities of pioneering and individual effort which were essential in that earlier frontier struggle. The problem of so rehabilitating and repatterning social and economic endeavor in this country as to assure every able citizen the right to work at a living wage once the abnormal conditions of wartime production are gone is America's new frontier. Central to this problem is that of the city and of the individual family dwelling.

The replanning and reconstruction of our urban and rural communities are the form which this central portion of the problem takes. Replanning and reconstruction as they are intended here are no short-time program but one extending over a long period of years, one as exacting and detailed as the program recently outlined by the London Regional Reconstruction Committee in its report on the proposal to rebuild the city of London. The work

which might be done and should be done in America finds occasion and necessity not in the immediate devastation of war but in the disastrous potentialities of latent decay. Thus lacking the urgent incentive of visible destruction, it is more easily postponed or ignored. In this fact is a cogent reason for early and vigorous action.

A united industry organized nationally, state by state and city by city, is essential for the accomplishment of a concerted program of replanning and reconstruction. Such an organization would have two purposes: the first, to create an intelligent, informed public opinion; the second, to secure action. For greatest effectiveness, it should be distinctly a private-industry venture, co-operating with such government agencies as can be judged necessary to the welfare of the nation. Six groups should be linked in organization for this program:

First, the planning group, including architects, city and regional planners, engineers, planning officials, highway officials, and private research groups.

Second, the producers and manufacturers of materials, comprising the Producers' Council, the National Association of Manufacturers, the American Road Builders' Association; the organizations maintained by the contracting industry and by the steel, lumber, concrete, automotive, and airplane industries; the public utilities, such as gas, electric, and telephone companies; and transportation services of all kinds.

Third, labor, including the American Federation of Labor and the Congress of Industrial Organizations.

Fourth, finance, comprising the American Bankers Association, the Mortgage Bankers Association of America, the United States Savings and Loan League, the National Association of Mutual Savings Banks, and the insurance companies.

Fifth, public health and education, including the American Medical Association, the American Public Health Association, the National Recreation Association, the American Hospital Association, schools, colleges, universities, and technical institutions.

Sixth, ownership and the public, comprising Chambers of Commerce, the American Bar Association, real estate organizations, building owners and managers, apartment house owners, private investors, neighborhood associations, women's clubs, tax associations, and foundations.

An organization consisting of representatives of these six groups and motivated by conviction of the importance of a broad approach to replanning and rebuilding, both as a correction of past evils and as a guarantee of future stability, can accomplish great things. The program to which such an organization should address itself is not one for professional architects and city planners only; it is one for the whole public. Important among the elements which must be considered in any project for post-war reconstruction, and which consequently are funda-

mental to the sort of program envisioned here, are those outlined in what follows. They are the factors on and with which the desired organization would work.

1. *Full Employment.* For the first time in the history of America, the problem of full employment is receiving nation-wide attention. It is of course fundamental to any proposal for widespread, co-ordinated replanning and rebuilding of cities and rural regions, for it is both a necessary initiating condition and a sure result of such effort. Actively at work on it, among other organizations, is the Committee for Economic Development under the chairmanship of Paul G. Hoffman, President of the Studebaker Corporation. Through studies of individual manufacturing plants, this committee is surveying the nation to find out the possibilities of increasing production after the war and of giving full-time employment to all. Examination of several of these reports indicates the very strong possibility that industry will be able not merely to maintain the present level of employment but to increase it. The relationship between incentive and production is being stressed by such men as C. E. Wilson of the General Electric Company, executive vice-chairman of the War Production Board, and James F. Lincoln of the Lincoln Electric Company. Another effort of the same kind is the National Planning Association, which consists of 14 leaders of industry, 14 of labor, and 14 of agriculture, under the chairmanship of William L. Batt, President of S.K.F. Industries and vice-chairman (international supply) of the War Production Board. One of the basic principles of the program of this group declares "that large-scale unemployment must not again stalk the land, that if masses of workers are idle or people are faced with starvation, the war will have been fought in vain."

2. *Money and Credit.* As part of its constitutional duty of maintaining the monetary system, Congress has from time to time exerted varied degrees of control over banking and credit. But there is still no method of co-ordination for the volume of long-term credit. For financing

its expansion, therefore, the building industry has been dependent upon the fluctuation of the volume of savings and investment, which does not appear to be directly related to the progressive needs of capital and investment. Credit and the requirements of production must be synchronized.

3. *Methods of Finance and Amortization.* The experience of years has shown that the earning power of real estate will not support the load of high interest charges which has been placed upon it. Better investment policy, it is to be hoped, will lead to progressively lower rates of interest with the opportunity of utilizing a larger proportion of the financing charges as amortization to speed the reduction of the loan.

4. *Taxation and Service Costs.* The tax on real estate, which is primarily a local matter, yields virtually all the revenue out of which local government defrays the cost of services rendered to the community. Since considerable evidence indicates a tendency toward the investor's loss of home, business, or farm through foreclosure because of this more or less single tax on real property without recourse to other sources of income, a restudy of the entire tax structure is a vital problem.

5. *Revision of Tax Assessment Methods.* The tax spenders and the tax collectors are a part of the same political organization. Control of the ways and means of levying taxes on real estate is therefore largely in the hands of the spenders and often is based on political expediency. Consideration should be given to the creation of tax authorities free from political influence, whose duties shall be to devise tax methods on sound scientific and economic bases.

6. *Relation of City Planning to Regional Planning.* America has been very backward in organizing proper planning agencies. Too often they have been under the control of political administrations. Since theirs is a highly technical field, planning agencies should be separated from politics. Another evi- (Continued on page 221)

The balconies of an apartment house in Copenhagen offer interesting perspective.



High-Pressure Salesmen

The Pioneer Efforts of Jacob Perkins and His Successors to Improve the Efficiency of Steam Power Plants

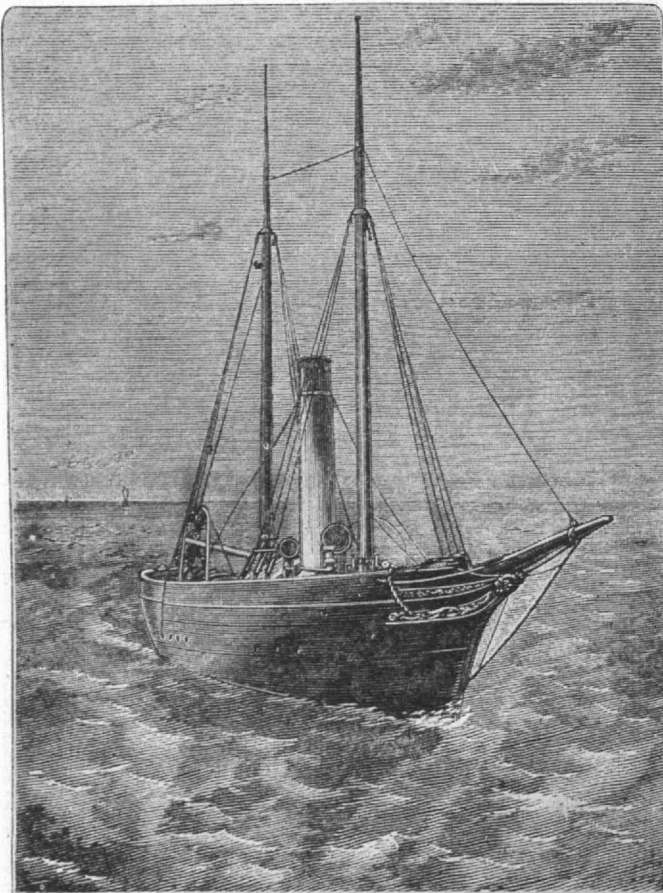
BY W. MACK ANGAS

MANY of the methods, processes, and devices of modern science and industry were unsuccessful when prematurely tried and promoted by pioneers to whom the techniques and materials of today were unavailable. Instances of such premature attempts to promote fundamentally sound ideas are found on many pages of the history of science and engineering. Brunel's construction of the *Great Eastern* in the 1850's and the campaign of Semmelweis to introduce antiseptics may be cited as examples of the efforts of individual pioneers who were perhaps a generation ahead of their times. Other inventors have been even further ahead of the technological developments which would later make their ideas practicable. Jacob Perkins was such a man. Over 100 years ago he attempted to improve the efficiency of the steam power plant by utilizing pressures that even today would be called extremely high, and so sure was he of the fundamental soundness of his proposal

that he devoted much of the energy of a busy, long, and otherwise successful life to the promotion of the "Perkins system" of using steam at high pressures. Years before the death of Jacob Perkins, his son, Angier M. Perkins, took up the task of promoting the utilization of steam at the pressures and temperatures which had been advocated by his father.

He succeeded in developing a practical application of extremely high-pressure steam to the heating of bakers' ovens, but he does not appear personally to have made any very serious attempt to utilize extremely high-pressure steam for the development of power, though in his later years he collaborated with his son, Loftus Perkins, in such work. Loftus Perkins, following the family tradition, carried out extensive research into the utilization of high-pressure steam in engines. By moderating the extreme pressures advocated by his grandfather to a mere 500, later 400, pounds a square inch, he built several small stationary and marine power plants which were at least partially successful. Even he was at least a generation ahead of his time, and with his death in 1891, the "high-pressure Perkins family" gave up its attempts to vindicate the soundness of Jacob Perkins' idea for the improvement of the efficiency of the steam power plant. Though the Perkins system of high-pressure steam plants was never accepted as practical, the engineering world is undoubtedly indebted to the pioneers of high pressure who promoted it and by so doing demonstrated that high-pressure steam plants were not inherently dangerous.

Jacob Perkins was born in Newburyport, Mass., on July 9, 1766. Little is known of his early life other than that his schooling was meager and that at the age of 13 he was apprenticed to a Newburyport goldsmith. When young Perkins was but 15 years old, his master died, and for a time he carried on the business. While still a boy he invented a method of plating shoe buckles which proved practical and profitable, and at the age of 21 he was employed by the Commonwealth of Massachusetts to make dies for copper coinage. At the age of 24, he invented a machine for cutting and heading nails at one operation, and later he became interested in engraving and invented a method for utilizing steel plates in lieu of copper plates. From Newburyport, Perkins moved to Boston and then to Philadelphia, and in 1818 he went to England with an associate and several workmen and there obtained a contract for supplying the Bank of Ireland with steel plates for engraving bank notes. While in England, he originated a process of transferring engravings from one steel plate to another by pressure, and he made to the art of printing and engraving other contributions which were widely used in such highly diversified fields as the engraving of postage stamps and the printing of textiles.



Anthracite, one of the smallest steamers, if not the smallest, to cross the Atlantic. Of 70 gross tons, she created great interest in engineering and yachting circles because of the demonstrated economy of the high-pressure "Perkins system" power plant with which she was equipped.

Perkins' inventions in the field of engraving and printing were undoubtedly profitable and enabled him to initiate and carry on experiments with high-pressure steam. Unquestionably he considered this work to be his most important contribution to the development of science and industry.

In 1823, when Jacob Perkins began serious experiments with steam at high pressures, the steam engine had become fairly common, but it was an extremely wasteful machine, utilizing steam at pressures which rarely exceeded 10 or 15 pounds a square inch, though Oliver Evans of Philadelphia was advocating and using boiler pressures as high as 75 pounds a square inch, and similar pressures were coming into use on the steamboats of our western rivers. At about this time, Sadi Carnot published his monumental *Réflexions sur la puissance motrice du feu et sur les machines propres à développer cette puissance*, in which he showed that the efficiency of a heat engine depended, other things being equal, upon the temperature range through which the machine worked. It is doubtful, however, that Carnot's mathematical researches into the theory of the heat engine were known to Perkins, who was probably led to advocate the use of high steam pressures merely by the fact that he realized that such pressures would permit the use of steam expansively to a far greater extent than would be possible with steam at the low pressures then popularly used.

At all events, Jacob Perkins in 1823 built an experimental steam power plant consisting of a copper boiler, the capacity of which was about one cubic foot and the sides about three inches thick. The steam from this boiler, the safety valve of which was loaded to 550 pounds a square inch, was used in a double-acting, 10-horsepower engine of 2-inch bore and 12-inch stroke. Perkins found, however, that with steam pressures exceeding 200 pounds a square inch he had great difficulty with the charring of packing and the burning of lubricants. To overcome these difficulties he developed an alloy which required no lubricant, and using this material he built a single-acting engine which utilized steam at 800 pounds a square inch. The engine was condensing, but no attempt was made to develop a vacuum in the condenser, which was used merely to furnish distilled water for boiler feed. The valve gear of this engine cut off at $\frac{1}{8}$ stroke.

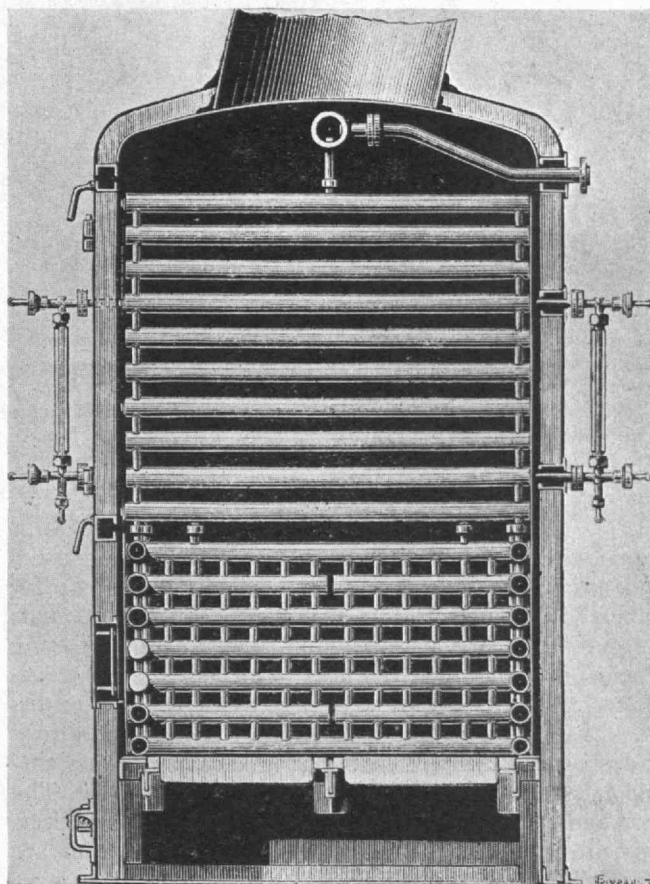
Encouraged by the results obtained with this engine, Perkins in 1827 built a compound engine using steam at 1,400 pounds a square inch. In the same year he proposed the construction of a marine engine using steam at 2,000 pounds a square inch in single-acting cylinders of 6-inch bore and 20-inch stroke to be fitted with valve gear cutting off at $\frac{1}{16}$ stroke. The condensation losses in such cylinders would have been enormous, and if the machine had been built it would undoubtedly have been a failure.

Jacob Perkins did not limit his proposed utilization of extremely high-pressure steam to the development of power in steam engines. He proposed and actually built a steam gun by means of which projectiles were fired by steam pressure at velocities comparing favorably with those then obtainable in muzzle-loading cast-iron cannon using ordinary gunpowder. He demonstrated his steam gun to no less an authority than the Duke of Wellington, who is reported to have been much impressed by the possibilities of the invention, though he feared that the rapidity with which it fired would lead to an appalling waste of shot! Other military authorities, however, re-

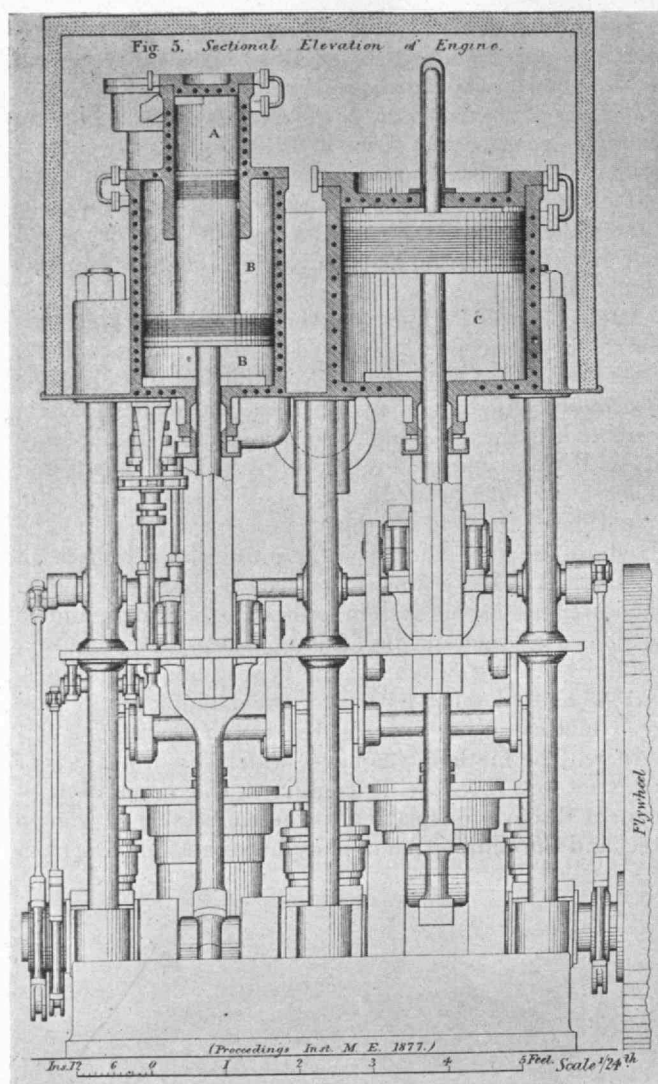
jected the steam gun, and it never got beyond the experimental stage, though A. M. Perkins tried to revive the idea at the time of the Civil War.

In spite of the fact that Jacob Perkins lived in London for many years, dying there in 1849, he never became a British subject. He was so staunch an American in spirit and character that his son and grandson always considered themselves Americans, though the greater part of their lives was spent in England, where the grandson was born.

Angier March Perkins, the son of Jacob Perkins, was born in Newburyport and lived in America until 1827, when he followed his father to England and there became associated with him in his business and also in his researches into the use of high-pressure steam. Undoubtedly A. M. Perkins inherited much of his father's talent, and at least part of the credit for Jacob Perkins' successful inventions in the field of printing and engraving should be given to the son. Shortly after establishing himself in England, A. M. Perkins introduced a successful forced hot-water circulating system for heating buildings, and he developed a large and profitable business designing and installing heating systems of this type in public buildings. In 1843 he took out a patent for the manufacture of iron by a method using superheated steam to remove impurities. The method was never widely used, but it is of some interest because it contained the germ of subsequent discoveries relating to the conversion of iron to steel and the elimination of phosphorus and sulphur from



The Perkins water-tube boiler of the Anthracite was constructed of wrought-iron tubes three inches in diameter, their ends closed by welding. Short lengths of wrought iron with right- and left-hand threads connected the horizontal tubes. The firebox was surrounded by tubes. Vegetable black insulation was used between the inner and outer sheet-iron casings of the boilers.



This is not the engine of the Anthracite but a typical Perkins stationary engine of similar design. The single-acting high-pressure cylinder is marked "A," the lower part of the cylinder below it being utilized as the single-acting intermediate-pressure cylinder. The space above the intermediate-pressure piston was connected to the valve chest of the low-pressure double-acting cylinder "C," so that any leakage that passed the rings of the high-pressure and intermediate-pressure pistons would be caught and utilized in the low-pressure cylinder. Note the wrought-iron heating coils embedded in the cast iron of the cylinder walls. Steam at boiler pressure was used in these coils to heat the cylinder walls and reduce condensation losses.

iron. One of A. M. Perkins' most successful, widely used, and profitable inventions was a heating system for bakers' ovens, using steam at a pressure of 2,000 pounds a square inch. He also invented a type of low-pressure steam boiler in which the heat from the fire was transmitted to the boiler by a closed circuit containing distilled water and steam at exceedingly high temperatures and pressures. Among his minor inventions was a right- and left-hand screw joint for high-pressure piping. The care and skill with which both Jacob and A. M. Perkins carried out their work with high-pressure steam are attested by the fact that no dangerous accidents ever occurred in any of their experimental or practical work. A. M. Perkins died in London in 1881 at the age of 81. At the time of his death, his inventions in both printing and engraving and in steam heating were widely used in Europe and America.

Loftus Perkins, the son of A. M. Perkins, was born in London in 1834. His early life was spent in London but like his father and grandfather, he considered himself an American. In 1853, he came to New York, where he practiced as an engineer for over a year. Returning to England, he rejoined his father and worked with him until 1862, when he went to Germany and lived in Hamburg and Berlin for four years, designing and installing heating systems of the type developed by his father. Returning to England in 1866, he re-entered partnership with his father and continued the association until the death of the older man.

When Loftus Perkins took up the development of his grandfather's idea for improving the efficiency of steam power plants by the utilization of extremely high pressures, he had at his disposal the engineering profession's growing knowledge of thermodynamics and the greatly improved materials and techniques of the Sixties and Seventies. Evidently he realized that the higher pressures with which Jacob Perkins had experimented were impracticable and that something would have to be done to reduce the condensation losses in the cylinders of his high-pressure engine. His researches led him to develop a simple type of water-tube boiler which could be operated safely at pressures of from 400 to 500 pounds a square inch and a somewhat peculiar type of triple-expansion engine which became known as the "Perkins engine."

To avoid the necessity of exposing piston rod packing to extremely high temperatures, Perkins made the high-pressure cylinder of his engine single acting. The intermediate-pressure cylinder was also single acting and was mounted below the high-pressure cylinder as shown in the accompanying drawing. The low-pressure cylinder was of the ordinary double-acting type fitted with a slide valve. The high-pressure and intermediate-pressure cylinders were fitted with poppet valves lifted by cams mounted on rockshafts actuated by eccentrics. In marine engines, reversing was accomplished by link motion on both the slide valve gear of the low-pressure cylinder and the poppet valve gear of the high-pressure and intermediate-pressure cylinders. The cylinders were heated by means of wrought-iron pipe coils embedded in the cast iron of both the main cylinder castings and the cylinder covers. To reduce radiation losses the cylinders were heavily lagged. The piston rings and piston rod packing of the Perkins engine were made of a copper-tin alloy which worked without lubrication. Rings of this metal were also used with considerable success in conventional engines.

In a paper published in the *Proceedings* of the Institution of Mechanical Engineers in 1877, Loftus Perkins described the machinery of the 57-foot launch *Emily*, which had then been running on the Thames for about five years. The little steamer had a triple-expansion Perkins engine taking steam at 500 pounds a square inch from a Perkins water tube boiler and exhausting into a surface condenser which furnished the distilled water required for boiler feed. In one trial the *Emily* steamed 60 miles in six hours on three hundredweight of coke costing but three shillings. Her success naturally interested the engineering profession in Perkins' work and no doubt led to the construction of two much larger marine power plants of the same general type.

The first of these was a paddle engine for a Tyne ferry, the *Loftus Perkins*, an old steamer which was renamed in honor of the inventor when the (Continued on page 226)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Festivities in February

Alumni Day 1944 to Be Held at Institute's Earlier Location; Paul G. Hoffman Is Announced as Guest Speaker at the Annual Banquet

ALUMNI Day 1944, to be held on Saturday, February 26, will be the third sampling of a substitute month in place of the traditional June as the occasion of Technology's annual gathering of good-fellowship. Commencement exercises, the 77th, scheduled this year for February 28, bring Alumni Day into the short month. In 1943, January was given a trial; in 1942, April. The program for Alumni Day this year is again of the shortened variety, the customary symposium being omitted. Class Day exercises for the Class of 1944 will be held on Saturday afternoon as usual, and the Alumni Day Banquet will take place that evening.

The site of the Institute's former home on Boylston Street will this year again be the scene of the festivities. The Class Day program, which will begin at two o'clock, will be held in New England Mutual Hall, in the building of the New England Mutual Life Insurance Company on Boylston Street in Boston, and the following tea dance will take place in a smaller hall in that building. The Classes of 1894 and 1919 will share in the Class Day program with the Class of 1944. The 50-year Class speaker is to be Alan A. Clafin, and Eugene R. Smoley will speak for the 25-year Class. Francis J. Chesterman, '05, President of the Alumni Association, will be toastmaster of the annual Stein-on-the-Table Banquet at seven o'clock in the Hotel Statler. President Compton during the evening will review the Institute's year, discussing the state of educational affairs beside the Charles as war demands and war research affect them. Paul G. Hoffman, President of the Studebaker Corporation, will be the guest speaker of the evening.

... Commencement ...

Graduation exercises will be held in Symphony Hall at eleven o'clock on the morning of February 28. The invocation will be offered by Lieutenant Colonel Abbot Peterson, post chaplain at Camp Edwards, and the commencement speaker will be Claude Moore Fuess, headmaster of Phillips Academy, Andover.

Dr. Fuess was graduated from Amherst College in 1905 and holds degrees from Columbia, Yale, Princeton, Dartmouth, and Williams. He joined the staff of Phillips Academy as an instructor in English in 1908, a post which he held until 1928, when he was appointed Elizabeth Milbank Anderson Foundation Professor of English. Dr. Fuess has been headmaster of Phillips Academy since 1933. He is a member of the boards of visitors of Amherst

Class Reunions Summarized

As thus far arranged, the schedule of regular five-year class reunions, which this year are on the agenda for the classes of -4 and -9, is summarized below. The midwinter celebration of Alumni Day 1944 has occasioned some departures from customary practice.

- 1884 — No plans for any reunion.
- 1888 — Usual annual Webster dinner in June. Exact date and place to be announced later.
- 1889 — No plans at present. The reunion if held will probably take the form of a small gathering in Boston similar to other recent gatherings.
- 1894 — Fifty-year reunion to be held early in June. Plans to be announced shortly.
- 1899 — No reunion, except at Alumni Day banquet, February 26.
- 1904 — Plans not yet definite, but it is hoped that a reunion will be held in June.
- 1909 — No thirty-five-year reunion. See 1909 class notes in this issue of The Review.
- 1914 — Small reunion in June somewhere along the New Haven railroad, provided suitable facilities are available. A general announcement is to be sent out later.
- 1919 — Twenty-five-year reunion in July at some point in Connecticut. July 28, 29, and 30 tentatively set as dates.
- 1924 — Get-together on Alumni Day, February 26, with room at Hotel Statler.
- 1929 — No reunion planned, except at Alumni Day Banquet, February 26.
- 1934 — General reunion June 2, 3, and 4, Friday, Saturday, and Sunday, at a place to be decided later, probably somewhere in Connecticut. Henry B. Backenstoss, Robert M. Becker, W. Leslie Doten, Jr., and John A. Hrones are the committee in charge.
- 1939 — Tentative plans for a get-together on Alumni Day, February 26. Details to be announced later.

College, Brown University, Harvard University, and the United States Naval Academy. He is also a trustee of Rogers Hall School and Governor Dummer Academy, as well as the Essex Institute and the American Antiquarian Society. During the last War he was civilian chief of the personnel division at Camp Joseph E. Johnston in Jacksonville, Fla., and later was commissioned a major in the Quartermaster Corps.

Dr. Fuess is a director of the Andover National Bank and a member of the Massachusetts War Memorial Commission, as well as the Headmasters Association, the Modern Language Association of America, the Massachusetts Historical Society, the American Legion, of which he is state historian, the Military Order of the World War, the American Academy of Arts and Sciences,

and the Amherst Alumni Council. In 1927-1928 he was president of the New England Association of Teachers of English. He has written widely in the field of biography and history, one of his best-known works being a biography of Calvin Coolidge.

. . . Baccalaureate . . .

Baccalaureate exercises will be conducted by the Rev. Carl Heath Kopf, minister of the Mount Vernon Church, Boston, and the baccalaureate address will be given by Major General Sherman Miles, commanding general of the First Service Command. The exercises will be held this year in Symphony Hall on Sunday afternoon, February 27.

General Miles was graduated from the United States Military Academy in 1905 and later attended the Army War College and the Command and General Staff School. He served successively in the Cavalry, the Coast Artillery, and the Field Artillery, and has held several posts on the General Staff. His service includes duty as a military attaché in Europe.

Honors

VANNEVAR BUSH, '16, former Vice-president of the Institute and now President of the Carnegie Institution of Washington and Director of the Office of Scientific Research and Development, has been awarded the Edison Medal for 1943. The medal, one of the most distinguished awards in the field of engineering, was presented by the American Institute of Electrical Engineers on January 26 at its technical meeting in New York.

Dr. Bush was chosen to receive the Edison Medal "for his contribution to the advancement of electrical engineering, particularly through the development of new applications of mathematics to engineering problems and for his eminent service to the nation in guiding the war research program."

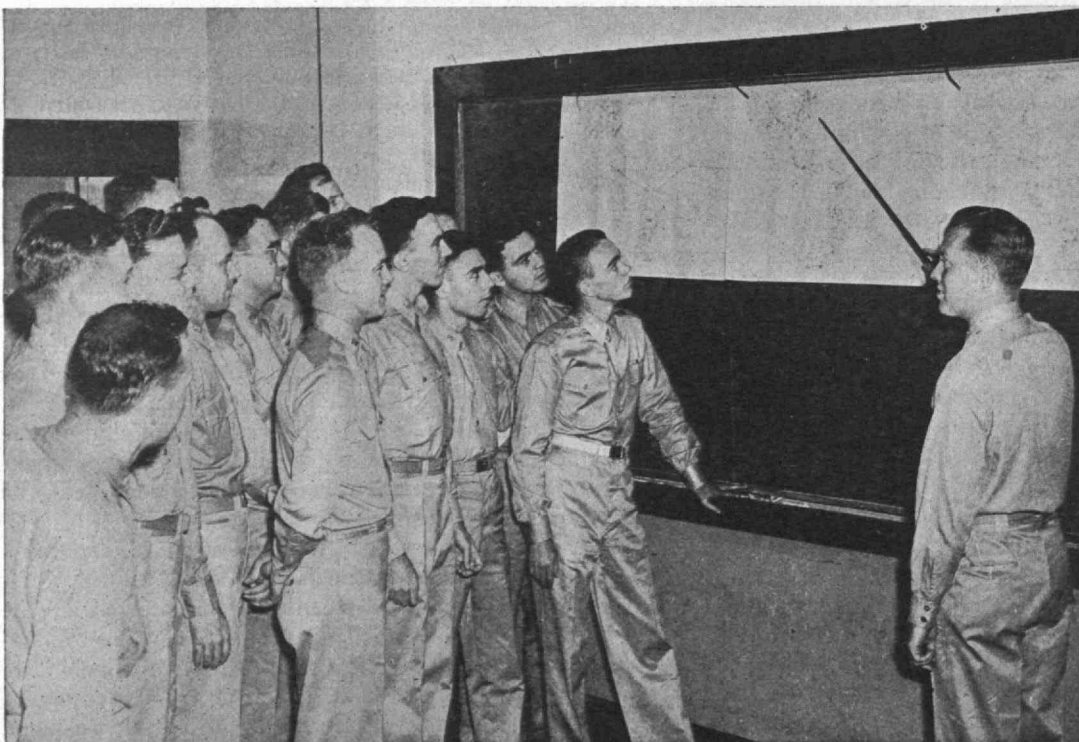
As head of the Office of Scientific Research and Development, Dr. Bush directs application of the entire technical resources of the United States to the war effort. The Edison Medal is the second engineering honor bestowed upon him recently. In December he was the joint recipient with Samuel H. Caldwell, '25, of the John Scott Award, which is given annually by the city of Philadelphia for the development of useful inventions — in this instance, the differential analyzer.

Dr. Bush and Dr. Caldwell began their research on the development of mathematical devices several years ago when Dr. Bush was a member of the Faculty of the Institute, and the machines developed as a result of their collaboration have played an important part in war research.

The John Scott Award was founded by John Scott of Edinburgh, Scotland, in 1816, "to be distributed among ingenious men and women who make useful inventions." The fund is administered by the Board of Directors of City Trusts of the City of Philadelphia, and recipients are chosen by an advisory committee composed of representatives of the National Academy of Sciences, the University of Pennsylvania, and the American Philosophical Society.

Dr. Bush was graduated from Tufts College in 1913 and received the degree of doctor of engineering jointly from Harvard and Technology in 1916. He joined the staff of the Institute in 1919 as professor of electric power transmission and in March, 1932, he was named vice-president of M.I.T. and dean of its School of Engineering. His appointment as president of the Carnegie Institution of Washington came in 1938.

Professor Caldwell was graduated from Technology in 1925, receiving the degree of master of science in 1926 and the degree of doctor of science in 1933. He has been a member of the staff of the Department of Electrical Engineering since 1926, and has held the rank of associate professor since 1940.



Army Air Forces students in a meteorology class at Technology view the cryptic chart.



United States Army Air Forces

Major Jay Zeamer, Jr., of the Institute Class of 1940, receives the Congressional Medal of Honor from General H. H. Arnold, commander of the Army Air Forces, at the Pentagon in Washington. His parents witnessed the ceremony at which Major Zeamer's heroism as pilot in a mapping expedition over Bougainville last June was signalized.

Beyond the Call of Duty

THE nation's highest award — the Congressional Medal of Honor — was bestowed January 6 on Major Jay Zeamer, Jr., '40, for his heroic conduct as pilot of a Flying Fortress on a volunteer mapping mission over Bougainville Island in June. The citation:

"By direction of the President, I take pleasure in awarding the Medal of Honor to Major Jay Zeamer, Jr., Air Corps, United States Army, for service as set forth in the following citation:

"For conspicuous gallantry and intrepidity in action above and beyond the call of duty. On 16 June 1943, Major Zeamer volunteered as pilot of a bomber on an important photographic mapping mission covering the formidably defended area in the vicinity of Buka, Solomon Islands. While photographing the Buka airdrome, his crew observed about 20 enemy fighters on the field, many of them taking off. Despite the certainty of a dangerous attack by this strong force, Major Zeamer proceeded with his mapping run, even after the enemy attack began. In the ensuing engagement, Major Zeamer sustained gunshot wounds in both arms and legs, one leg being broken. Despite his injuries he maneuvered the damaged plane so skillfully that his gunners were able to fight off the enemy during a running fight lasting 40 minutes, and to destroy at least five hostile planes of which Major Zeamer himself shot down one. Although weak from loss of blood, he refused medical aid until the enemy had broken combat. He then turned over the controls but continued to exercise command and, despite lapses into unconsciousness, to direct the flight to a base 580 miles away. In this voluntary action, Major Zeamer, with superb skill, resolution, and courage, accomplished a mission of great value.

— Henry L. Stimson, Secretary of War"

Major Zeamer, a graduate in Civil Engineering, was a member of the Aeronautical Society, the American Society of Civil Engineers, and the Outing Club during his years at the Institute.

Toward Better Library Facilities

AT the October meeting of the Corporation, the Visiting Committee on the Library presented with its endorsement the following statement from the Faculty Committee on the Library:

The plans for a proposed library building presented to the Visiting Committee on the Library and discussed at its meeting in March, 1942, make it appropriate for the Faculty Committee on the Library, whose principal function is to advise on matters of policy, to present a succinct statement of the reasons why a new building is needed. The design and location of such a building would be finally decided upon by a special building committee. This statement is concerned with the functions such a building should serve — not with its architecture, its location, or how it is to be financed.

The Institute Library began with separate and widely scattered working collections of books and periodicals which had been found indispensable adjuncts to the teaching and research done by the several Departments. As these collections increased in size and value, proper supervision by trained librarians was found necessary. The Institute received by gift and bequest valuable collections such as that bequeathed by Theodore N. Vail. When the move to Cambridge was made, the original plan for the present buildings provided quarters for the central collections of the Library on the first floor of Building 10. Later, however, it was found necessary to assign the Central Library to its present far less satisfactory location in the Dome, which is relatively inaccessible, without adequate space for necessary administrative work, and with no possible provision for expansion. Twenty-seven years in this location have brought the Central Library to a somewhat congested condition.

Experience has shown the undesirability of concentrating in a single central collection the working library facilities of the major Departments of the Institute. Scientists and engineers must have the most frequently consulted books and periodicals located as near as possible

to their offices and laboratories. The present policy of grouping the working collections of several adjacent Departments in large branch libraries, such as Eastman or Lindgren, has in the past decade so thoroughly justified itself that it is no longer seriously questioned by anyone concerned. Without doubt such Departments as Biology and Biological Engineering and Electrical Engineering will in the near future desire and expect to have this policy extended to them. The case for a new library building does not therefore depend on the need for housing the everyday working collections of our major scientific and engineering Departments, since these are, or will eventually be, for the most part housed in large branch libraries conveniently accessible to their respective users.

The administration of the branches must, however, be centralized. There must be, as now, a card catalogue including every title the Institute possesses. There must be proper facilities for cataloguers and for the numerous other specialists on our library staff, as well as for the clerical workers who lift from these trained professional workers the burden of semiskilled routine tasks. There must be a centralized general reference collection. There must be adequate housing for rare and valuable books. Anyone who looks over our present Central Library with an open and inquiring mind will certainly conclude that its functions are indispensable and that the staff now charged with these manifold and often highly specialized tasks is constantly hampered in its work by badly designed and seriously overcrowded quarters. No alterations could possibly make adequate the present quarters of the Library under the Dome; no additions to the present quarters can be made; a move is long overdue.

Incidentally, the working collections of the Departments constituting the Division of Humanities could be most satisfactorily housed in a new library building. For these Departments the library is, in effect, a laboratory. Since their fields of interest overlap, a pooling of their library resources would be highly desirable. The effectiveness of instruction in such subjects as history, literature, and economics depends very largely on ample and accessible library facilities of a kind which could adequately be supplied at the Institute only by a new building.

The proper administration of the present library facilities of the Institute can be provided only by a new building. Moreover, the present and future position of the Institute in the educational world demands that henceforth a far broader view be taken of the function of our Library. It should serve as a center of scientific and engineering research. It should be in a position to offer better facilities for our Alumni and for industry. It should be in a position to attract gifts and bequests both of books and of funds. It should be a great library, outstanding in those branches of knowledge in which the Institute is pre-eminent.

The northeastern region, although geographically representing only a small fraction of territorial United States, is nevertheless the seat of a substantial proportion of American scientific and engineering research and enterprise. Technology must have the vision to develop its library resources and facilities so that it will inevitably become the center of this activity. Although other large libraries exist in this general area, their scientific and engineering resources are so diluted with and dominated by material primarily of interest to other fields that use

of their resources is, in practice, tedious and difficult. The smaller, highly specialized libraries are so widely dispersed that integration of their resources by the individual user becomes prohibitively expensive in time and effort. By gradual but steady development and extension of our present very considerable collections, augmented by particular effort in supplementary services such as microfilming, photostating, bibliographic searching, preparation of reviews and surveys, and so on, the Institute can bring under one roof the most valuable and usable bibliographic research center in the whole northeastern region. Such eminent leadership as this is hopelessly beyond the scope of our present library plant; it can be realized, however, by adequate planning now for the future ahead.

The Institute Library has long striven to be as useful as possible to our Alumni in neighboring industries, and to industry as a whole. We have reference librarians who answer many inquiries, and we extend library privileges to many industrial concerns. But our ability to serve industry and Alumni has hitherto been in some respects limited by the obvious prior obligation to keep essential books as far as possible constantly available to our own staff and to students engaged in research. The working collections in Eastman and Lindgren, for example, are maintained primarily for the daily use of our own staff and students. Ideally speaking, those books which are likely to be needed by industry and by our Alumni should be duplicated. This would mean having a complete collection housed centrally in a new building, for the use of visiting research men and of any others to whom it seemed wise to extend the privilege. The branch collections would then consist largely of duplicate copies of books needed for working collections. Outsiders would seldom need to borrow books from these branch collections, which would be almost wholly reserved, as they perhaps should be, for the constant use of our own men. To attain this ideal would obviously be very costly. If, however, we are to extend a service to Alumni and to industry much beyond what is now offered to them, we must provide for a good deal of duplication of essential titles. Such duplication, where the fields of Departments served by different branches overlap, is an inevitable consequence of the policy of decentralizing departmental working collections, to which, as we have seen, we are already definitely committed. Further duplication merely extends the present policy in a somewhat different direction. A library in an educational institution, after all, exists primarily to serve the members and friends of that institution. Whether they need five copies of the same book or single copies of five different books is a matter of detail, not of principle.

Since it is evident that the provision of adequate housing is an essential basis for any further development of our library facilities, the Faculty Committee on the Library earnestly direct the attention of the Corporation Visiting Committee on the Library to the need of an ample and appropriate library building at the earliest possible moment (as soon after the war as new construction for nonwar uses becomes permissible). Such a building we believe to be necessary if the Institute Library is to be properly administered, if it is to serve as a center of research, if it is to offer adequate aid to industry, and if it is to take and hold the place fitting for the library of an educational institution of the first rank.

For Extraordinary Heroism

BREAKING his return journey from Cairo in December, President Roosevelt on a visit to Sicily decorated six American officers with the Distinguished Service Cross. One was Lieutenant General Mark W. Clark, commander of the Fifth Army fighting in Italy. One was Lieutenant William W. Kellogg of the Infantry, a year and a half away from Technology.

Lieutenant Kellogg, who was graduated from the Institute in Chemical Engineering in April, 1942, was active in undergraduate affairs, captaining the fencing team in his senior year, serving in the advanced Reserve Officers' Training Corps unit, being a field day marshal and a member of the pistol and rifle teams.

The story of exploits which were recognized by the President's bestowal of Lieutenant Kellogg's D.S.C. is best told by the citation which accompanied the decoration: "First Lieutenant William W. Kellogg, infantry. For extraordinary heroism in action from September 14, 1943, to September 28, 1943, between Paternapoli and Montello, Italy. As leader of an air-borne platoon, Lieutenant Kellogg landed with his men 40 miles behind enemy lines and for a period of 13 consecutive days in the face of constant danger and overwhelming enemy odds, courageously conducted outstandingly successful operations in enemy territory. During this period Lieutenant Kellogg personally led his men in disrupting telephone, power, and railroad lines, and demonstrated outstanding bravery and aggressiveness in his constant harassing of the enemy."

"In one night's action against superior enemy forces Lieutenant Kellogg gallantly led his band in the ambush of an enemy convoy, destroying two troop carriers and inflicting many casualties on the enemy. On September 24 he demonstrated personal heroism of the highest type in rescuing a severely wounded Allied airman whose plane was shot down behind enemy lines. In close proximity to the enemy and under intense aerial bombardment and a hail of fire from enemy guns, Lieutenant Kellogg, with utter disregard for his own life, made his way to the wounded man on an open hillside, carried him to cover, and succeeded in delivering him to friendly hands. Lieutenant Kellogg's outstanding personal valor, his inspiring leadership despite hunger, thirst, fatigue, and constant danger, and his exceptional devotion to duty no matter what the odds, reflect the highest traditions of the military service and are a credit to the air-borne forces of the United States Army."

Promotion

CARL M. F. PETERSON, '29, has been appointed superintendent of buildings and power at the Institute, to succeed the late Albert V. Smith, '20, whose assistant he had been since 1938. Mr. Peterson joined the staff of the Institute in 1929 as an assistant in the Department of Mechanical Engineering, became an instructor in 1931, and was promoted to the rank of assistant professor in 1939, serving until his present appointment. Following his graduation from the Department of Mechanical Engineering, he carried on graduate work and was awarded the degree of master of science in 1932. Mr. Peterson was born in Boston and prepared for the Institute at the Mechanic Arts High School.



M. I. T. Photo

Carl M. F. Peterson, '29, becomes superintendent of buildings and power at a time when the always busy Institute faces additional demands.

Greetings

FROM faraway Chungking a week before Christmas there came to the Institute renewed evidence that the long-standing close relationship between Technology and China continues strong as ever. The following exchange of radiograms, transmitted through the co-operation of Lieutenant Colonel Robert F. Seedlock, '40, in Chungking, records the event:

"Season's greetings to our alma mater from members of Chungking M.I.T. Club organized December 18.

—Y. H. Ku, President"

"M.I.T. welcomes new Chungking Club with hearty season's greetings to President Y. H. Ku and all members.

—Charles E Locke"

Technology groups in China in years past have set a good example to groups in the United States, maintaining organization and activities in spite of arduous conditions. The newly formed Chungking Club thus has a good tradition behind it. The opportunities for useful work available to Technology organizations in China were illustrated by the Technology Club of Shanghai a few years ago, in its successful program of raising money and conducting educational courses for young engineers which were recognized as of great value to the Chinese Republic.

President Ku of the Chungking Club was graduated from the Institute in Electrical Engineering in 1925, and continued directly with graduate study, receiving the degree of master of science in 1926 and that of doctor of science in 1928. He has been a member of the faculty of the University of Chekiang and of Tsing Hua University in Peiping before removing to Chungking.

Add Filial Roster

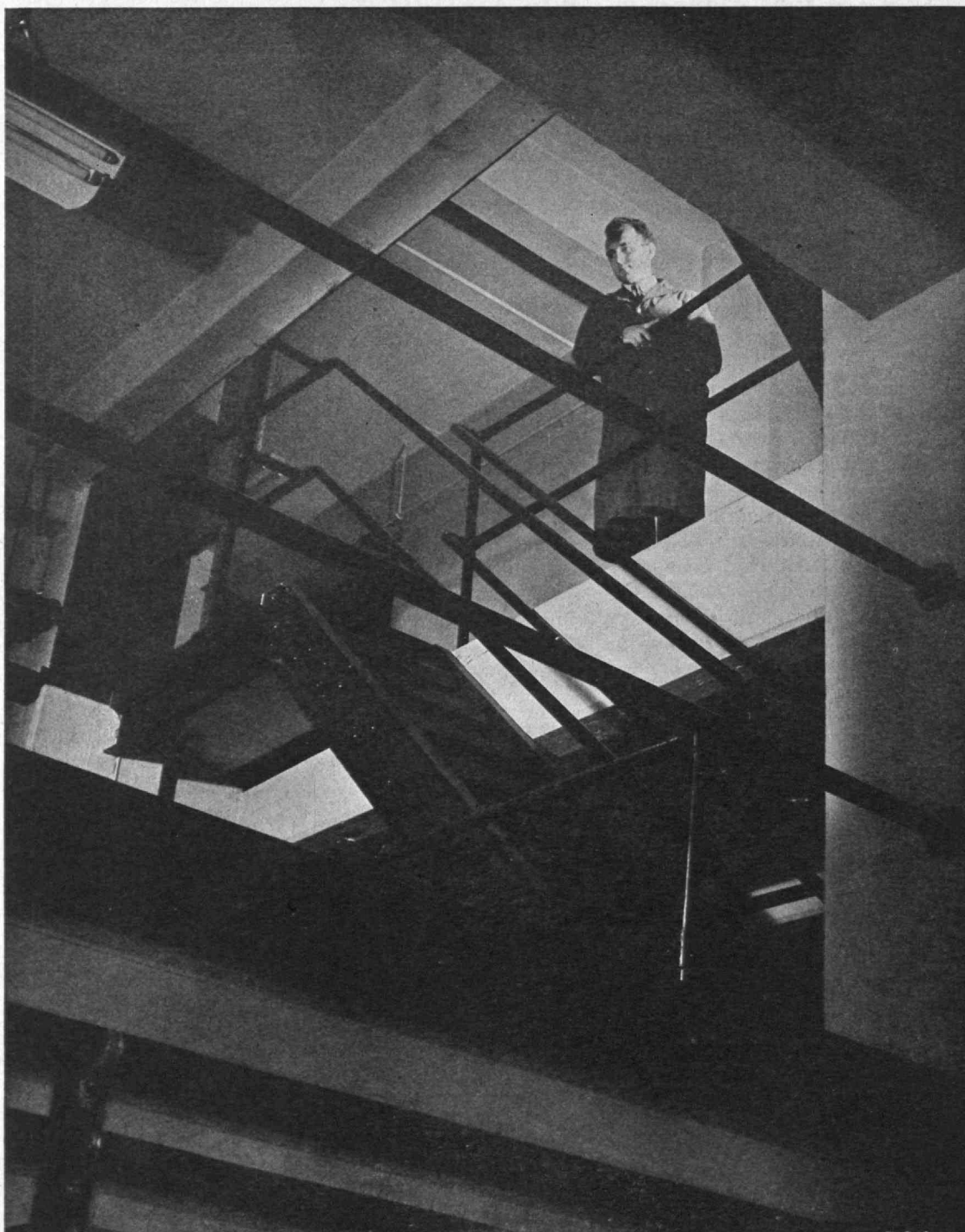
LISTS and statistics, with which educational institutions are rich in normal times, are among the earliest items to suffer dislocation as a result of wartime pressures.

Hence The Review with a blush here reports that its list of freshman sons of alumni fathers in the January issue was marred by an inadvertent omission. Included should have been Ralph Berman, son of Eli Berman, '18. As an alumnus father, Mr. Berman is doubly represented; another son, George, is a member of the present sophomore class. The total of sons of Alumni enrolled in the freshman class at the present time thus becomes 38, as compared with the 47 recorded a year ago.

Alumna and the Alloys

The Review takes much interest in its irregular series of sketches of the careers of notable Alumnae of the Institute, one of which is presented herewith. — Ed.

WAR telegrams are handled accurately and speedily by wire materials tested and chosen by a brilliant Technology Alumna, Frances Hurd Clark, '22, chief metallurgist for the Western Union Telegraph Company. Some of the advances in the science of telegraphy — exemplified, for instance, by the increase in volume of traffic handled over a wire from 30 to 40 words a minute to as high as 2,800 letters a minute — can be credited to the tireless and successful (*Concluded on page 234*)

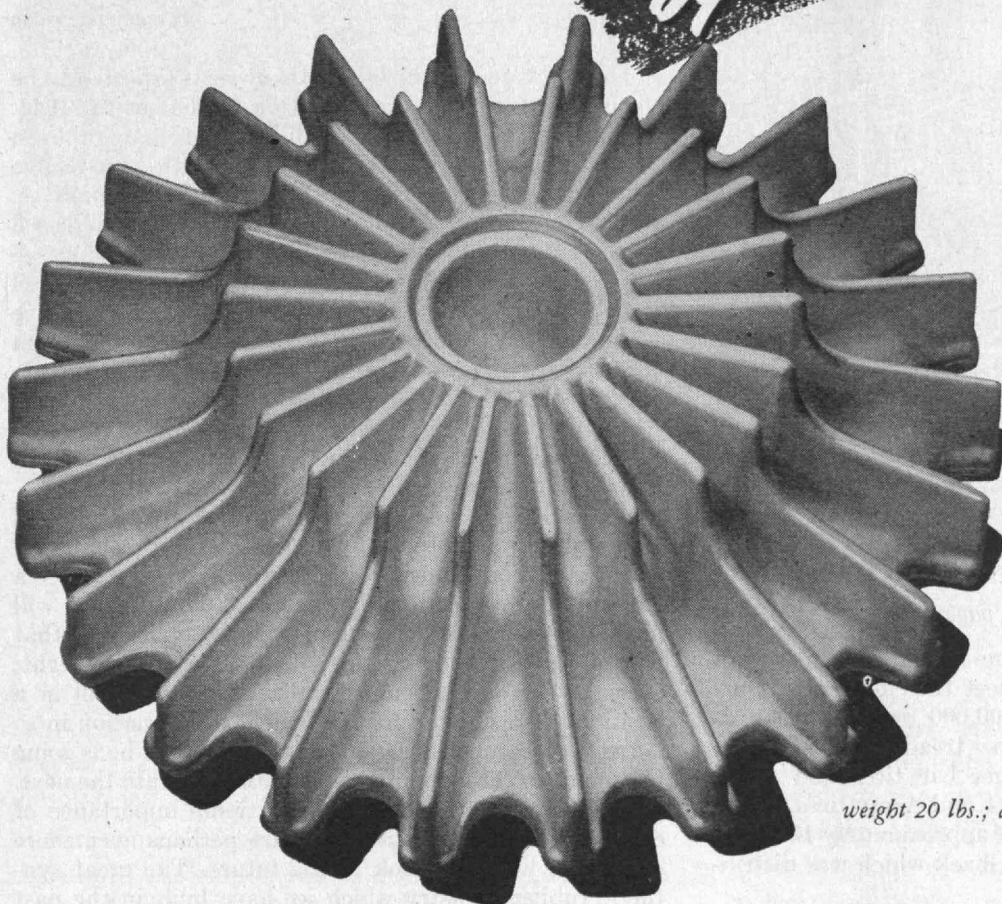


Mezzanines assuring efficient utilization of space in the Richards Mineral Dressing Laboratories also offer pictorial interest.

M. I. T. Photo

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by REVERE



weight 20 lbs.; diameter 10 $\frac{3}{4}$ "

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Revere will be glad to offer—*without obligation*—technical advice on any special problems you may have in die-pressed forgings. Write Executive offices.

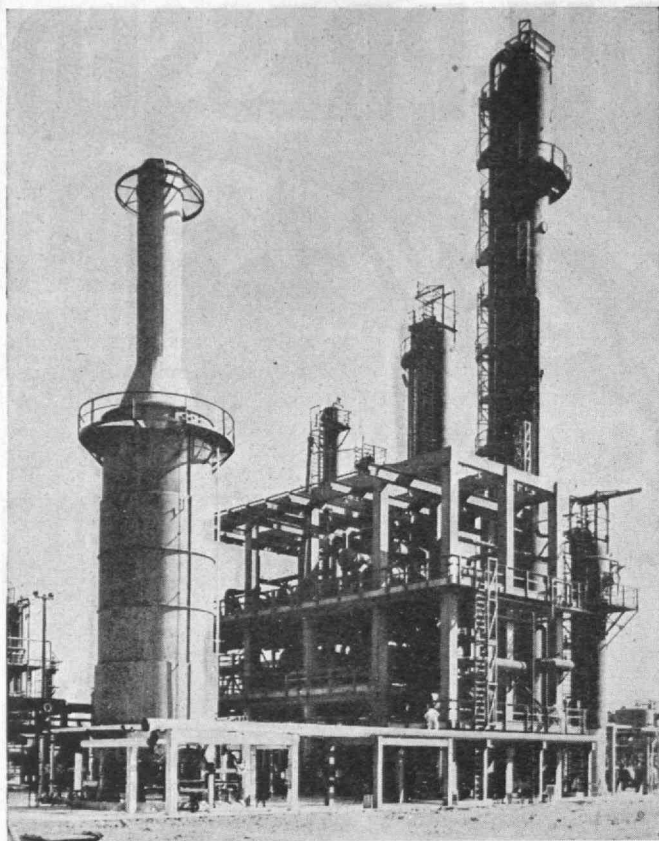
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THE RUBBER SITUATION

(Continued from page 196)

of the rubber industry have done an outstanding job of expansion and production to meet the emergency. During the past year, about 167,000,000 pounds of camelback (formed, compounded rubber tread stock) were distributed for recapping passenger car tires and about 59,000,000 pounds for truck, bus, and Army tires. These figures compare with the total of approximately 105,000,000 pounds of all types of camelback which was distributed in 1942.

Having thus surveyed the major factors entering into the rubber equation, let us translate them into figures. The following two tables summarize the story. Table 1 shows in long tons the actual use of crude and synthetic rubbers in the United States during 1943 and estimates of requirements for 1944.

TABLE 1

| | 1943 | 1944 |
|--|----------------|----------------|
| Military | 268,400 | 390,000 |
| Trucks and busses | 81,400 | 145,000 |
| Passenger car tires | 42,500 | 184,000 |
| Other indirect military and civilian uses... | 32,100 | 38,000 |
| Total | 424,400 | 757,000 |
| Exports | 73,500 | 146,000 |
| Canada | 33,100 | 50,000 |
| Grand total (long tons) | 531,000 | 953,000 |

Balancing what we have used and must use against what we have had and shall have, Table 2 shows that the synthetic rubber program really got under full way just in

time to safeguard us against disastrous difficulties, and makes plain why we must look forward to continuance of restrictions for some time.

TABLE 2

| | 1943 | 1944 |
|--|----------------|------------------|
| Inventory, January 1 (long tons) | 443,000 | 205,000 |
| New supplies | | |
| Crude | 60,000 | 81,000 |
| Synthetic | 233,000 | 818,000 |
| Total | 736,000 | 1,104,000 |
| Requirements | 531,000 | 953,000 |
| Balance, December 31 | 205,000 | 151,000 |

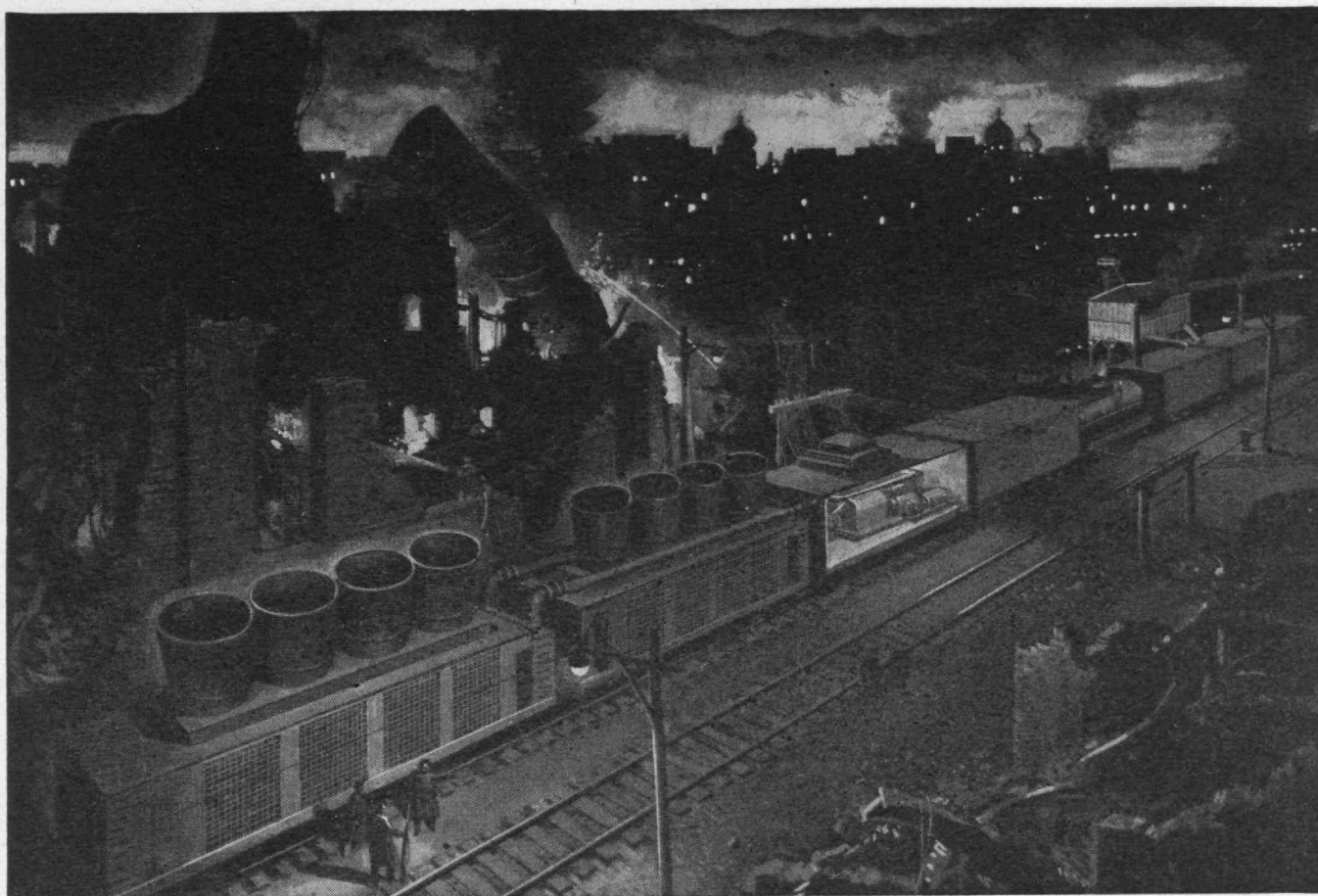
The stock pile by the end of this year is expected to be some 54,000 long tons less than on December 31, 1943. And a larger proportion of it will be in synthetic rubbers, so that our crude stocks will be below the irreducible minimum recommended by the Baruch Committee. Restrictions on the use of crude rubber will be increased during 1944, until we have reached the ultimate objective of practically complete conversion to synthetics (for all but a few large tire sizes, and so on) and are able to live within our income of new crude receipts. Once the rayon cord shortage is overcome, we shall not be under the necessity of dipping so deeply into crude reserves for the production of the heavy highway tires of large size and the large airplane and construction-equipment tires which now cannot be made of synthetics.

Quantitatively, then, we can rightly expect to see all the vital military needs of the present fully met, to see essential civilian transportation maintained, and to see a gradual improvement of the general situation which will in due time permit relaxation of restrictions. But that relaxation cannot be considered as at present in sight; every owner of a car must realize that he is still in a position of trusteeship for the benefit of the nation in so far as his present tires are concerned, and that he is going to remain so throughout this year and well into the next.

Qualitative considerations, of extreme importance of course in the present situation, are perhaps even more conclusive when we look to the future. The great synthetic rubber industry which we have built in the past two years is here to stay; what sort of equilibrium will be reached between it and industry based on natural crudes will depend in great measure on the comparative performance and relative cost of the products. Hence the service which synthetic rubber is now giving in military applications to win the war is valuable as a measure of questions of adjustment and adaptation after the peace.

There need be no fear that synthetic passenger car tires will not be adequate. That statement does not mean that the miracle-man everlasting tires some people talk about are just around the corner; on the contrary, no evidence is available of just how such a tire could be produced. It does mean that today's high-grade passenger car tire made from all-synthetic rubber is as good a tire as all but the top-grade first-line tires made from crude rubber a few years ago. In even the short time that Buna S has been available in quantity, the rubber companies have made tremendous progress in learning how to work with this new material. The difficulties of milling which were a hazard in the utilization of Buna S are steadily being overcome.

(Concluded on page 214)



When the lights go on again in Grigoriopol

Three short years ago Grigoriopol was a thriving city of the Russian Ukraine. Today it is a scene of desolation . . . victim of ravaging Hitlerite hordes.

But some day—soon we hope—lights will go on again in Grigoriopol, and in other Allied cities now under the Nazi heel.

When that time comes . . . thanks to a new idea in modern warfare . . . emergency electric power will be available to revitalize industries in war torn cities—immediately after they are retaken from the enemy.

This new idea—a self-contained POWER-TRAIN—has now been made a reality by the engineering brains and skill of Westinghouse.

Ten of these POWER-TRAINS are now being built by Westinghouse for use by the United Nations . . . each a complete 5000 kw power house on wheels, big enough to serve a community of 15,000.

Each POWER-TRAIN consists of 8 cars. Ingeniously assembled in these cars are: a 5000 kw steam turbo-

generator, boilers, power stokers, boiler feed pumps, air-cooled condensers, auxiliary Diesel engine, living quarters for the crew—even conveyer equipment for handling coal which will be mined locally for fuel.

Because cooling water is not always available, air-cooled condensers are used to recover, as water, a high percentage of the exhaust steam from the turbine.

From switchgear to turbo-generator, each POWER-TRAIN is a complete 5000 kw mobile power house, ready to go to work at a few hours' notice . . . *in sub-zero cold or tropical heat of the desert.*

And remember—the same Westinghouse engineering brains and skill that developed the POWER-TRAIN will be available, after Victory, to create and build better products for you.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.

*Tune in John Charles Thomas,
NBC, Sundays, 2:30 p.m., E.W.T.*

Westinghouse
Plants in 25 Cities Offices Everywhere

WANTED

for the

PHILCO ENGINEERING STAFF

● RADIO—ELECTRONICS—ELECTRICAL ENGINEERS

Men with degrees in electrical engineering or comparable experience in radio and television.

● MECHANICAL ENGINEERS

Men with college degrees or comparable experience in the engineering aspects of electrical appliances, and in designing small machinery.

● DESIGN ENGINEERS — DRAFTSMEN

Men with experience in mechanical designing, especially of small metal parts and of the automatic machinery to mass-produce them.

● PRODUCTION ENGINEERS

Including electrical and mechanical engineers familiar with any phase of radio, radio-phonograph and television production.

● PHYSICISTS

Must have science degree in physics. Some practical experience in radio is desirable.

FOR these and other key positions—senior and junior engineers for research, project and design work, physicists and mathematicians—we are looking for men who are thinking about the future. Right now there is plenty of urgently needed war work to do. But some day peace will return—and Philco is planning to be ready for it with advanced Radio, Television, Refrigeration and Air-Conditioning products. This may be your opportunity to get ready for it too.

WRITE US TODAY

Qualified men not now engaged in work requiring their full talents, are invited to write us in detail as to their experience, education, family and draft status, and salary. Letters will be treated in strict confidence.

Employment subject to local W.M.C. rules.

WRITE TO MR. GEORGE DALE

PHILCO

CORPORATION

Philadelphia 34, Penna.

THE RUBBER SITUATION

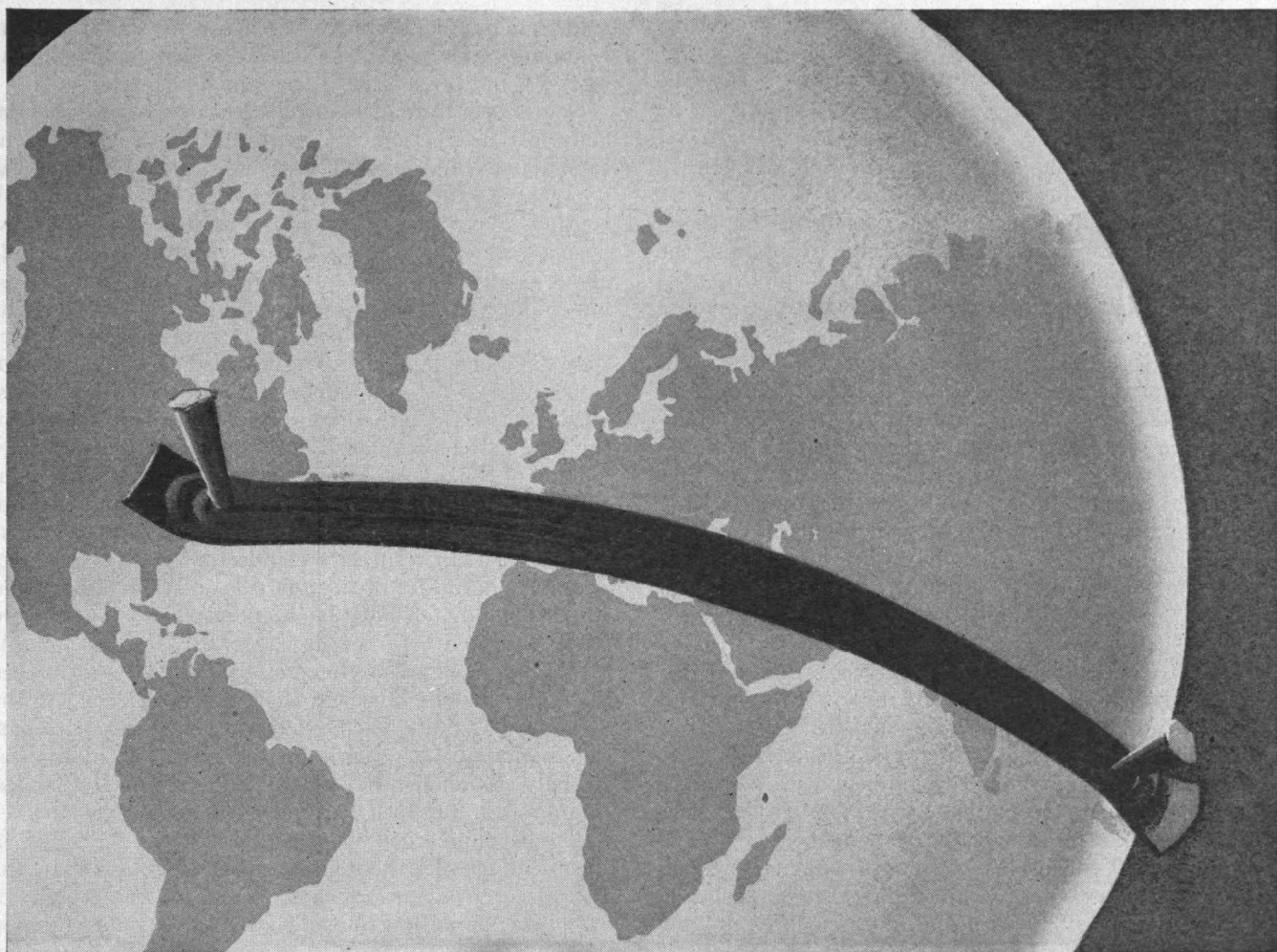
(Concluded from page 212)

As part of the rubber program, extensive testing facilities have been made available for the development of products made of synthetic rubbers, which are being manufactured commercially only after performance tests have indicated that they will give adequate service. The same applies, of course, to synthetic rubber products for military uses. On the basis both of these tests and of recorded service, it cannot be overemphasized that in two respects Buna S suffers more sharply than does natural rubber from the deleterious effects which heat exerts on any tire. When any rubber is subjected to repeated alternate compression or elongation, heat is generated. In Buna S, more heat is generated than in natural rubber. But perhaps more serious, the decrease which heat produces in tear resistance and other qualities is much greater in Buna S than in natural rubber. Consequently, under identical running conditions, the compounded synthetic stock will not, at high temperatures, stand as much abuse as will the natural rubber stock. Greater care, therefore, must be given to synthetic than to crude rubber tires. If properly inflated, properly loaded, and not abused, these synthetic tires can be driven at reasonably high speed over smooth roads to give 90 per cent or more of the tread wear of first-line pre-war tires.

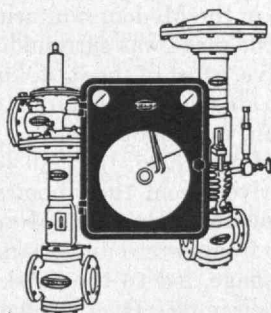
The ultimate costs of the various synthetics and the raw materials that go into them cannot yet be accurately predicted. It is safe to say, however, that after the war many of them will be available at prices far lower than were ever contemplated in the past. The efficiency of processing, operation, and management in our synthetic rubber establishments is increasing daily, yet months must necessarily elapse before the optimum is reached. Some constituent materials, notably alcohol, are being used at prices several times those of pre-war days. And under today's conditions there is no time to determine the by-product values that unquestionably lie hidden in the wastes from many of the plants, especially those producing butadiene from alcohol.

Future direct manufacturing costs will be affected by all these factors. Postwar amortization and financial charges will be influenced by the extent to which abnormal and normal costs of building the program are written off as "cost of war." Raw materials from some sources can be had at less cost than can the same materials from other sources, but the conditions may be reversed after the war. Though some of the processes now being used may not be economically competitive under postwar conditions, others have every reason for becoming permanent parts of the postwar economy. Reckoning all these factors, we may conclude that certain combinations of low-cost raw materials probably will give a postwar direct cost for Buna S of less than 15 cents a pound.

In any event, we may feel sure that the all-out effort of engineers, technicians, and scientists to establish the rubber program in time, and the patriotic contribution of the rubber, chemical, and petroleum industries in pooling for the public interest secret practices and formulas formerly guarded as the lifeblood of individual firms, not only will have prevented national disaster in time of war but also will have laid the basis for the permanent establishment of a new and essential industry in time of peace.



The 10,600-mile stretch...



Before the Japs had conquered the East Indies, America's scientists and chemists planted miniature rubber plantations in the United

States by creating synthetic rubber.

From Massachusetts, 10,600 miles away, came Masoneilan controls which made

possible the processes which have enormously stepped up the production of rubber ... American made rubber ... and prevented the loss of Far East supplies from being a major disaster.

MASONEILAN

MASON-NEILAN REGULATOR CO.
1197 ADAMS ST., BOSTON, MASS.

New York Philadelphia Pittsburgh Tulsa Toledo Chicago
 Atlanta St. Louis San Francisco Los Angeles Houston
 Mason Regulator Co. of Canada, Ltd., Montreal, Canada

PRINTING PRESS vs. TYRANNY

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which folded shortly after Simon's flight, could well be those of practically any of the secret newspapers. Most of them encounter the same difficulties and problems in securing their supplies, in printing, and in distribution.

Supplies were first obtained, in the main, by theft; but as the need for greater quantities increased and the Gestapo grew more vigilant, supplies were supplemented through the conniving of patriots who juggled warehouse records and made secret shipments to the operators, or through undercover paper salvage drives.

Printing the papers is always hazardous. Many have been forced to move their locations as often as 50 times during the several years they have been publishing. Usually they have been tipped off well in advance that the Nazis were on their trail, and so have made their escape with time to spare, taking their equipment with them. On other occasions they have fled only a few hours — or even a few minutes — ahead of the Gestapo. And all too frequently they have been caught and martyred.

Distribution is handled through a number of trusted keymen who place blocks of the papers in the hands of district leaders who, in turn, divide them among others, and so on. The method is so set up that each distributor knows only two or three others of the organization. This is to preclude any chance of his divulging the names of more than that number of accomplices if he is caught and faces the dreaded Gestapo "persuasive" treatment.

People of all social classes volunteer their time and money in the service of the underground press, either in distributing copies, gathering information, or supplying equipment and materials. In Belgium some of the most zealous of the peddlers are children, who daringly go everywhere with their copies and are reported to have pinned pamphlets even on the backs of nazi soldiers riding in busses and streetcars. In Yugoslavia a decrepit, shabby septuagenarian carrying editorial copy for an underground paper passed under the nose of the Nazis regularly. Only after many months did they discover that this harmless-appearing old derelict carried the papers in the cane which he used to help him limp along the road. As a result he and his family were shot.

Although it is generally understood among readers that the papers are common property and are to be passed on after being read, many carry such instructions on the front page. Hence while a paper may print only 1,000 copies, as many as 10,000 or more persons undoubtedly read that issue. Copies of the papers are to be found everywhere: in theaters, restaurants, railway stations, busses, streetcars, rest rooms, and churches; many are even being read and handed on in the streets. Although the Nazis have tried every means, they have been unable even to slow the flood of underground publications.

In the main the papers have common objectives, although each does its bit to spread the individual tenets or beliefs of the organization or political group which publishes it. In France the church is quite active in the underground press, and the Catholics and Protestants have lately combined efforts in the publication of one paper. A significant feature of the secret press in all the occupied lands — an aspect which may indicate a trend toward labor-dominated governments — is the prominent role played in publication by labor organizations,

trade-union groups, and other leftist associations. The communists and socialists are exceedingly active in the underground press of all the occupied countries.

Contents of the papers include local items, propaganda, editorials, instructions in acts of resistance, exhortations to sabotage, and current war news in areas where the population is unable to keep up to date through radio reception. The papers also meet an important need by exposing nazi sympathizers and by informing the people about — and thus putting them on their guard against — impending German "co-operation" programs, which the editors have an uncanny knack of uncovering before they have been announced. They also carry accounts of atrocities and list the names of those executed, imprisoned, or pressed into the German labor corps. Most of the publications regularly discuss postwar programs.

Each of the occupied countries, perhaps because of national psychology, has emphasized certain types of propaganda, and these leanings have been reflected in the columns of their respective clandestine papers. In Yugoslavia the activities of the guerrilla warriors under General Mikhailovitch have been extensively reported, and lately Tito and his forces have come in for considerable attention. Because of the political differences between these two leaders, however, there has been a split in the underground press, each group rallying behind its particular champion — Mikhailovitch being looked upon as strongly nationalistic and Tito being supported by the communists. But both continue to fight the Germans.

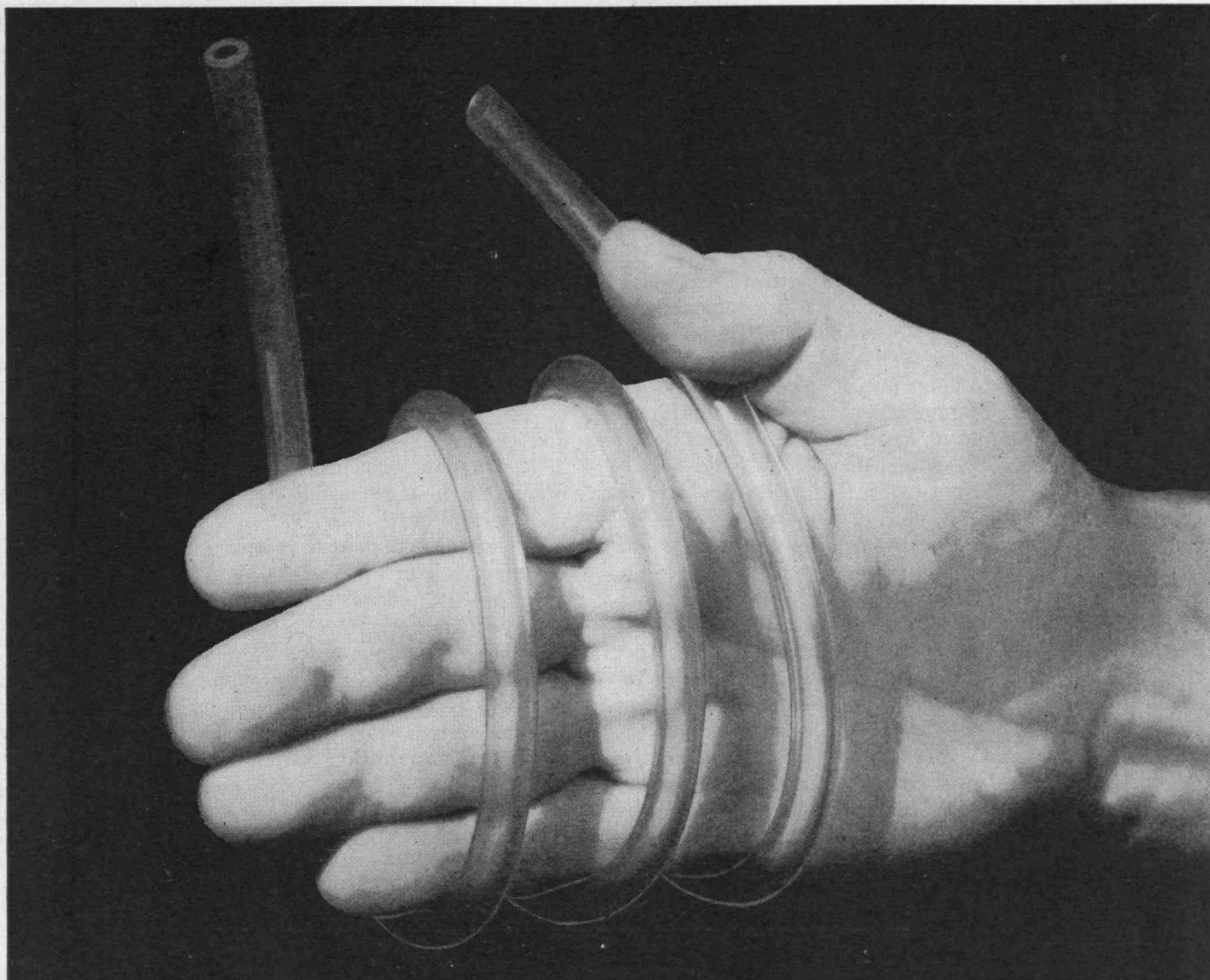
The extreme cruelty and ruthlessness of the Nazis in their dealings with the Poles have been highlighted by the Polish secret papers, which are packed with accounts of atrocities committed by the Germans, particularly upon the Jews, who are reported to have been massacred by the hundreds of thousands. The Jews have been put to death in all manners in the nazi pogrom, without regard for age or sex. A favorite method, according to one Polish paper's report, is to seal hundreds of Jews in boxcars, the floors of which have been covered with lime, and then ship them long distances without opening the cars for any reason. Any who survive the journey are immediately put to work at hard labor on starvation rations and most of them die soon thereafter. The Nazis find this method almost 100 per cent effective and cheaper than bullets.

A vivid account of a Jewish execution is the following from a Polish secret paper: "In Miedzeszyn the Nazis planned to kill 250 children in the Medem sanitarium for Jewish workers' children. The place was surrounded and the personnel ordered to leave. Most of the staff, knowing what was coming, refused to abandon the children to their fate. All, adults and children, were shot."

Another: "On the night of March 25, 1942, all Jews in the Lublin district were driven from their homes. The sick and crippled were killed where they lay. More than 100 children, ranging in age from two to nine years, were taken from a Jewish orphanage, led to the outskirts of town, and murdered with their nurses. Over 2,500 persons were massacred that night; the remaining 26,000 Jews were moved to a concentration camp at Belzec. In Radom, the Gestapo visited the ghetto every day, killing all Jews they found in the streets and yards."

Most French papers point to General de Gaulle as leader of the country and recognize him alone as the representative of the French people. They have relentlessly

(Concluded on page 218)



TYGON TUBING — A BETTER PIPING MEDIUM FOR GAS, AIR, AND LIQUIDS

EXTREMELY tough, highly resistant to abrasion, immune to the action of most corrosives, Tygon plastic tubing is finding unlimited use in industrial applications that formerly could be met only by metal or rubber.

Tygon tubing is available in any desired degree of flexibility—as rigid as bone, or as flexible as twine. Certain formulations retain their flexibility at temperatures as low as -70° F. Tygon tubing may be made glass clear, translucent or opaque, or in an almost unlimited range of color. Extruded to rigid dimensional accuracy, Tygon tubing is stocked in a wide range of standard sizes. It can be made in varying wall thicknesses and in virtually any shape cross-section desired.

Tygon tubing is acid-and-corrosion proof; is unaffected by oils, gasoline, alcohols or water; unlike rubber, it is not subject to oxidation and will not chemically deteriorate with age; nor will it scale nor tuberculate. Tygon tubing may be made completely non-toxic, of vital importance in food or drug processing. It will not affect the most delicate flavor or color.

Tygon's excellent dielectric strength; its ability to withstand repeated flexing, and its non-combustible nature, permit its use in applications where no other material has proven satisfactory.

Tygon tubing is used for acid, air and gas lines, for laboratory tubing, for gasketing, bumpers, conduits, channel strips, sleeving, bushings, in fact, for almost any purpose where a flexible,

sturdy, highly corrosion-resistant tubing is required.

The basic characteristics of Tygon tubing are available in other Tygon formulations: Tygon sheet and gasketing materials; Tygon molded items; Tygon Paint; and Tygon liquid formulations for coating, dipping or impregnation purposes. Write today for the new Tygon Bulletin. Address your inquiries to The U. S. Stoneware Company, 6201 Tallmadge Circle, Akron, Ohio. If you live in Canada, to: Chamberlain Engineering, Ltd., Montreal.


U. S. STONEWARE
 AKRON, OHIO

PRINTING PRESS vs. TYRANNY

(Concluded from page 216)

denounced the Vichy regime as well as all members of the Vichy group and strongly protested the Allied acceptance and recognition of Admiral Darlan as the French provisional chieftain. Because of his early association with Darlan in North Africa, General Giraud earned the mistrust of most units of the French secret press.

It is interesting that *Combat*, in its North African edition of November, 1942, predicted the death of Darlan. In the text of an article criticizing Allied allocation of power to Darlan, *Combat* wrote in part: "In default of Darlan, *whose days are numbered* [italics mine], of Giraud, who seems to fight shy of power . . . who will be given the power of government? . . ." Following the assassination of Darlan on December 24, *Combat* tacitly approved the act by commenting in its issue late in that month: "We did not love Admiral Darlan. His activities at Vichy since the defeat, his policy of collaboration with the oppressors of France, did not qualify him, in our eyes, to bring French Africa into the war of liberation for our country. Admiral Darlan is dead, the victim of a murder which we condemn, because we condemn murder. Peace to the ashes of Admiral Darlan." Whether the French underground was in any way responsible for the death of Darlan, and, if so, whether *Combat* was aware of the plot before it took place, or whether the paper's guess was just a guess is an interesting conjecture.

The French secret press is so powerful an instrument today that its reactions are carefully considered by Vichy and even by the Germans in the occupied zone. Distribution is reported to be perfected beyond that of any other

country, and its sources of information are said to be so close to the authorities that they are able to introduce virtually nothing without its first having been revealed in the press. The scorn and contempt with which the Vichy regime is held by the press and the people are aptly summed up in new definitions of the units in the celebrated French motto of "*Liberté, Égalité, Fraternité*" which appeared in *Libération* in June, 1942:

"We thank you, gentlemen of Vichy, and we thank your Nazi masters.

"Your police and your prisons have taught us once more the meaning of Liberty.

"The imbecile, petty tyrants who represent you throughout the country have taught us once more the value of Equality.

"As for Fraternity — we have found it, against you and against your masters, in the faith which inspires us, in the immense enthusiasm which wells up in us and which, on the approaching day of liberation, will sweep you away forever."

The history of the underground press, when it is fully recorded, will bristle with tales of personal heroism and devotion to the cause of freedom, without counting the cost. For the present, however, this epic story must remain largely anonymous. Editors and printers of underground newspapers have done much to weaken the German war resources by discouraging all co-operation in German activities, by encouraging sabotage and reduced production in munition plants, and by organizing resistance to nazi oppression. More important still, they are preparing their readers to rise in revolt at the appropriate moment and see that as few of the occupation troops as possible live to leave the lands they have violated.



MATERIALS HANDLING EQUIPMENT

for All-Out Production



STACKERS • JACKLIFTS • SINGLELIFTS • HYDRAULICS • FLOOR TRUCKS • SKIDS • POWER FORK TRUCKS

Multiply ManPower

LEWIS-SHEPARD PRODUCTS INC.
251 WALNUT STREET, WATERTOWN, MASS.
Sales Representatives in Principal Cities. Branch Factory, Crawfordsville, Ind.
Distributors of Lewis-Shepard Products

LEWIS-SHEPARD

BUY WAR BONDS—FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW





End of an Enemy

In a split second this enemy plane will be blasted from the skies by a shell from one of our anti-aircraft guns on the ground.

How can a gun hit a plane going 300 miles an hour 20,000 feet up . . . when it takes the shell 15 seconds to get up there and in that time the plane has gone more than a mile? Besides, the shell curves in its flight. Wind blows it. Gravity pulls on it. Even the weather affects its velocity.

The answer is the Gun Director—an *electrical* brain which aims the guns. Swiftly it plots the plane's height and course. Instantly it solves the complex mathematical problem, continuously matching the curved path of the shell to the path of the plane so that the two will meet. It even times the fuse to explode the shell at the exact instant.

The *electrical* Gun Director has greatly increased the deadliness of anti-aircraft gunfire. Developed by Bell Telephone Laboratories and made by Western Electric, it is one of many war weapons now being produced by the peacetime makers of Bell Telephones.

*Until the last enemy plane is knocked down,
buy War Bonds regularly—all you can!*



Western Electric

IN PEACE...SOURCE OF SUPPLY FOR THE BELL SYSTEM.
IN WAR...ARSENAL OF COMMUNICATIONS EQUIPMENT.



"Who, ME?"



YEP, YOU! This time we're talking to *civilians*.

That other ad you have in your hand, we ran some months ago. It was addressed to service men — explaining the advantages of Uncle Sam's NATIONAL SERVICE LIFE INSURANCE, in which we sincerely believe and on which we don't make a nickel.

A flock of friendly letters thanked us for our advice, and many Army and Navy insurance officers seem to feel that the ad helped contribute to this very heartening fact:

Over 95% of the men in military service today have NATIONAL SERVICE LIFE INSURANCE averaging better than \$9000 for each man — more than twice as much as the national civilian average per family.

Does this mean that *you* care less about *your* family than the fighting men do about theirs?

Of course not. It means simply that far too few civilians are realistic in recognizing the daily hazards that take their toll on the home front.

And even if you are one of those who own *more* than the service man's average, ask yourself this question — "Is my insurance coverage *enough* to give my family the security they need and deserve?"

If it isn't, why not *do* something about it? The solution is simple. For planned protection to fit your personal needs, call one of our *Career Underwriters*.

★ BUY WAR BONDS EVERY MONTH ★

To men about to enter the service

See your regular agent and arrange to keep your present life insurance *in force*. This is made easy for you, but there are papers to sign.

For your information, we have published a folder, "What the Service Man Should Do About His Life Insurance." A post-card to our Home Office in Boston will bring it to you.

Upon enlistment, be *sure* to take the full \$10,000 of NATIONAL SERVICE LIFE INSURANCE to which you are entitled, *in addition* to the regular life insurance you already own.

New England Mutual
Life Insurance Company  of Boston

George Willard Smith, President • Agencies in Principal Cities Coast to Coast
The First Mutual Life Insurance Company Chartered in America—1835

Do civilians love their families less?

The advertisement on the opposite page points out the disparity between the life insurance estates of the average service man and civilian. Probably you're well above the national civilian average. But regardless of amount, two comments still apply.

1. Wartime tensions—extra work and worry—may make you uninsurable. 2. Wartime changes—in family or finances—may upset your insurance set-up. And either can happen without your realizing it.

Every life insurance program ought to be reviewed regularly to keep it up to date. Perhaps yours needs it now. Below is a list of people who can counsel you.

They're alumni of your college and they talk your language. They are also trained representatives of the First Mutual Life Insurance Company Chartered in America.

Out of their experience you'll get *practical* suggestions. They'll help you make the most of your limited life insurance dollars—help you protect your present policies with premium loans if necessary.

RAYMOND P. MILLER, '18
Salem

ARTHUR C. KENISON, '19
Boston

BLAYLOCK ATHERTON, '24
Nashua

If none of these folks is near you,
just use the coupon below.

NEW ENGLAND MUTUAL LIFE
INSURANCE COMPANY OF BOSTON
Box 1-5, 501 Boylston St., Boston 17, Mass.

Please have one of your representatives
get in touch with me, without obligation
on my part.

Name _____

Street _____

City _____

State _____

AMERICA'S NEW FRONTIER

(Continued from page 201)

dence of backwardness is the fact that very few of our educational institutions have adequate planning courses. The outlook of city planning, moreover, often is not so broad as the problems involved demand. For the accomplishment of the kind of advanced thinking which is imperatively needed, much information on the condition of cities and on the purpose of a planning program must be collected.

7. *Real-Property Inventory.* A new idea, the real-property inventory is an audit of the properties in a city, evaluating vacancies, the physical condition of buildings, and other elements important in determining replanning problems. We actually know little or nothing about the condition of our cities from the economic, social, and physical standpoints. The real-property inventory hence should be a going concern in every municipality, for sound planning can be done only on a basis of sound factual information.

8. *Land Values and Administrative Costs.* On few subjects has more misinformation been circulated than on land value. Use is the true determinant of the value of land, which may yield no return when it is badly administered and which, even if inferior, may yield appreciably if well administered. In spite of this fact, land values in our large cities have been raised out of all proportion to their actual use value, through continued speculation. The use value of low-cost housing certainly indicates that land on which subsidized housing is to be built should be low in cost. Yet in some of our large cities, housing projects are erected on land costing from \$1.00 to \$5.00 a square foot — \$40,000 to \$200,000 an acre. If we limit the number of families per acre to 20, we start our subsidized low-cost housing with a charge as high as \$10,000 per unit for land before we have even started to erect the building. As a result, we have found ourselves subsidizing housing, including land and building, from \$15,000 to \$16,000 a unit. The absurdity of this procedure needs no further illustration.

9. *Control of Land Use.* Some people advocate government ownership of all the land, one proposal being that land in the cities should be bought in at the appraised value and resold at a proper use value. One can imagine that the taxpayers of America would revolt at this proposal and insist upon a slower and economically sounder policy. Revision of the tax structure, removing some of the tax burden from land, will tend toward the reduction of cost. In some cases, owners will have to accept a reduction in the value of their land in order to provide for the use of it in the city redevelopment program. There is no doubt that control must be maintained over land use in order to prevent unregulated construction and the erection of nuisance buildings in residential areas, as well as other abuses of our present system of building cities.

10. *Improvement in Design and Construction.* It is a fact that before the war the manufacturers of automobiles were producing better cars at lower cost. It is also a fact that we were producing inferior houses at higher cost and that the relationship between the income of the American people and the cost of construction has made it impossible for us to carry on housing under private industry to the extent that we should. The public should be freed from the damaging effect of trade restrictions,

of combinations to prevent the introduction of new methods and materials, and of archaic, overrestrictive, and too specific building codes. A strong effort should be made to reduce the fluctuations characteristic of the building industry, in which the greatest activity takes place in periods of high prices, but building slows down, and mechanics and laborers suffer from unemployment in periods of low prices. A greater amount of prefabrication should be encouraged. Architects should help to dispel the erroneous impression that the purpose of prefabrication is to provide for demountability. Its true purpose is to transfer from field to shop as large a proportion of the work as can be effectively and economically assembled in advance. As they learn to design in terms of prefabricated parts, architects will learn that the discipline which is afforded by prefabrication is a stimulus to improved design.

11. *Private Enterprise and the Government.* During the past 20 years, much controversy has centered on the relationship between private enterprise and government ownership. The debate has been confused because many have been unable to distinguish between abuses of exploitation for private profit and liberty to initiate private enterprise and to derive a just economic reward therefrom. Here is opportunity for educational institutions to undertake clarification of an important issue.

12. *Housing Policy.* On a recent visit to America, Sir Ernest Simon commented on what he described as our lack of a housing policy. This is a true indictment against us. Most of our so-called government housing has resulted from studies of European housing built by nations with ideologies different from ours. The mass

housing they produced was socialized and became subject to political abuses. Great Britain's housing policy permits no more than 12 families to the acre, and each family has a garden of its own. If we agree that any nation depends for stability on home ownership and the right to a piece of land, our continued construction of storage warehouses for human habitation is a tendency in the wrong direction. Many believe that following the war, new types of transportation will make it possible for people to live away from the crowded cities and yet do their work. If so, much present "housing" may well turn out to be a drug on the market. In all the discussion that rages about housing, we should keep in mind the fact that the crux of the problem lies in the disproportionate relation of the incomes of users to the costs of building. This disparity is the basis of the calls upon government to intervene with subsidies. It is for each of us to support a movement to cut housing costs all along the line — from the cost of construction, which is caused in part by obsolete building codes, to the costs of land, of taxation, and of finance. This done, the general program of postwar reconstruction should provide full employment at good wages and so greatly reduce the proportion of our population in the lower third of average annual incomes.

13. *Recreation Needs.* Reference has already been made in this paper to the huge crime bill of twelve billion dollars a year. We shall go nowhere in the solution of our crime problem until we eliminate juvenile delinquency, which J. Edgar Hoover declares to have reached the most alarming proportions in the history of America. The relation between juvenile delinquency and recrea-

(Concluded on page 224)

POOR & COMPANY

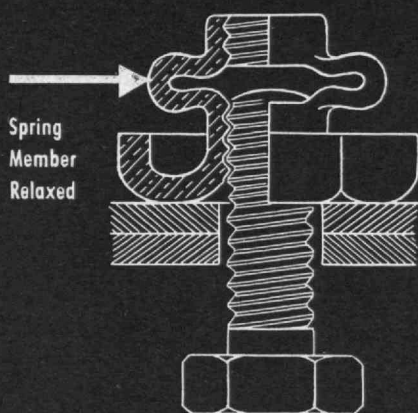
RAILWAY EQUIPMENT

CHICAGO, ILLINOIS

IT ASSURES VIBRATION-PROOF CONNECTIONS

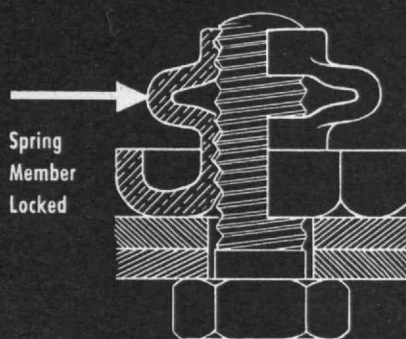
BEFORE

bolt engages locking section of the nut



AFTER

bolt engages locking section of the nut



ELIMINATES AXIAL PLAY

The Boots Self-Locking Nut is one piece, all-metal—withstands severest vibration. The top (locking) section is displaced in a downward direction . . . locking threads are out of lead with load carrying threads of lower section.

Upon insertion of bolt, top section of nut is extended to engage with threads of bolt. A constant force is thus established which locks nut firmly into position. Axial thread play is eliminated.

OTHER ADVANTAGES:

1. Because Boots Nuts are *all* metal, they are not affected by the corrosive action of oil, chemicals or water.
2. They have greater re-usability in maintenance than other nuts.
3. They resist high temperatures.
4. They meet the exacting specifications of all government aviation agencies in an industry where loose fastenings could not be tolerated.

There's a BOOTS NUT for every application

ROL-TOP



BOOTS

ANCHOR



BOOTS AIRCRAFT NUT CORPORATION

GENERAL OFFICES, NEW CANAAN, CONNECTICUT

AMERICA'S NEW FRONTIER

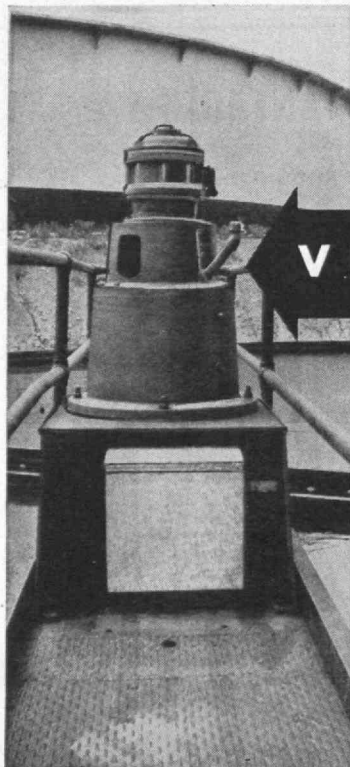
(Concluded from page 222)

tional facilities is well known; it was recently emphasized by findings of the commission appointed by Mayor La Guardia in New York to examine school planning and construction, which showed from police records that where new recreation grounds had been provided and properly supervised, juvenile delinquency decreased 50 per cent in one year. The least important part of the crime situation is the cost in dollars; the most important is the lowering of the moral fiber of the nation. This problem must be reckoned with, since it is not only definitely connected with the political, economic, and social phases of planning but with the actual physical planning as well.

MANY other matters are of interest and importance to this program but are too large in scope for discussion here. Among them is planning of this kind for trade, business, and industry, which up to the present has received scant attention. Chaotic conditions exist in construction in this field. Another item is transportation and circulation. The automobile has made it imperative that consideration be given to traffic flow, parking, and related problems. In the matter of needed legislative assistance, work must be done on legislation with respect to money and credit, on delegation by state legislatures of authority to local subdivisions of government — the county, the city, the incorporated village — to undertake certain tasks for which they are best adapted in connection with planning.

Zoning and land use ordinances are of extreme importance in any rebuilding program. At present, these ordinances are generally chaotic and too much under political control. Another requisite is the passage of laws to permit the condemnation of land by private building corporations, illustrated in the New York redevelopment laws of 1941-1942 as amended in 1943. The police power to raze obsolete buildings and to regulate existing uses should be strengthened and given wider public support. Many buildings unfit for human occupancy are now illegally in use. Perhaps one of the most important questions is that of standardizing building codes on a national basis and passing basic legislation which will set up boards of standards and appeal with power to issue standard regulations to control type of construction and permissible materials.

Such a program as has here been outlined should engage the attention of all Americans interested in creating better living and working conditions in this country. Though it offers admirable aid in meeting the arduous conditions of employment and readjustment to be foreseen after the war, it is by no means a temporary expedient to meet an emergency. Rather, it is a long-term undertaking, made up of many separate divisions which can and should be approached individually by those best qualified to outline the proper action. This new frontier in America provides not only for architects, planners, builders, and engineers but also for all thoughtful citizens one of the greatest opportunities this country has ever experienced. This frontier can be mastered by men with courage and intelligence, and it must be mastered if our way of life is to be assured.

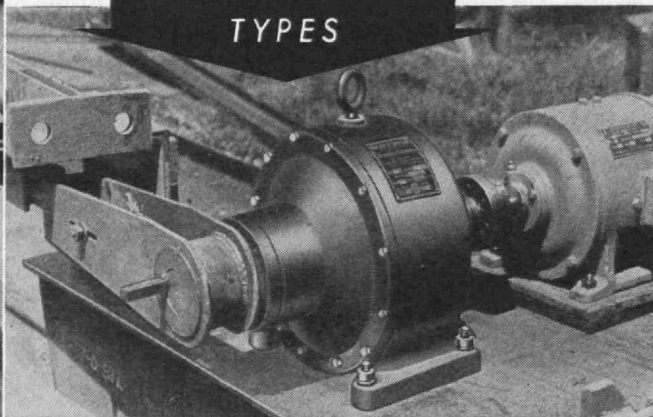


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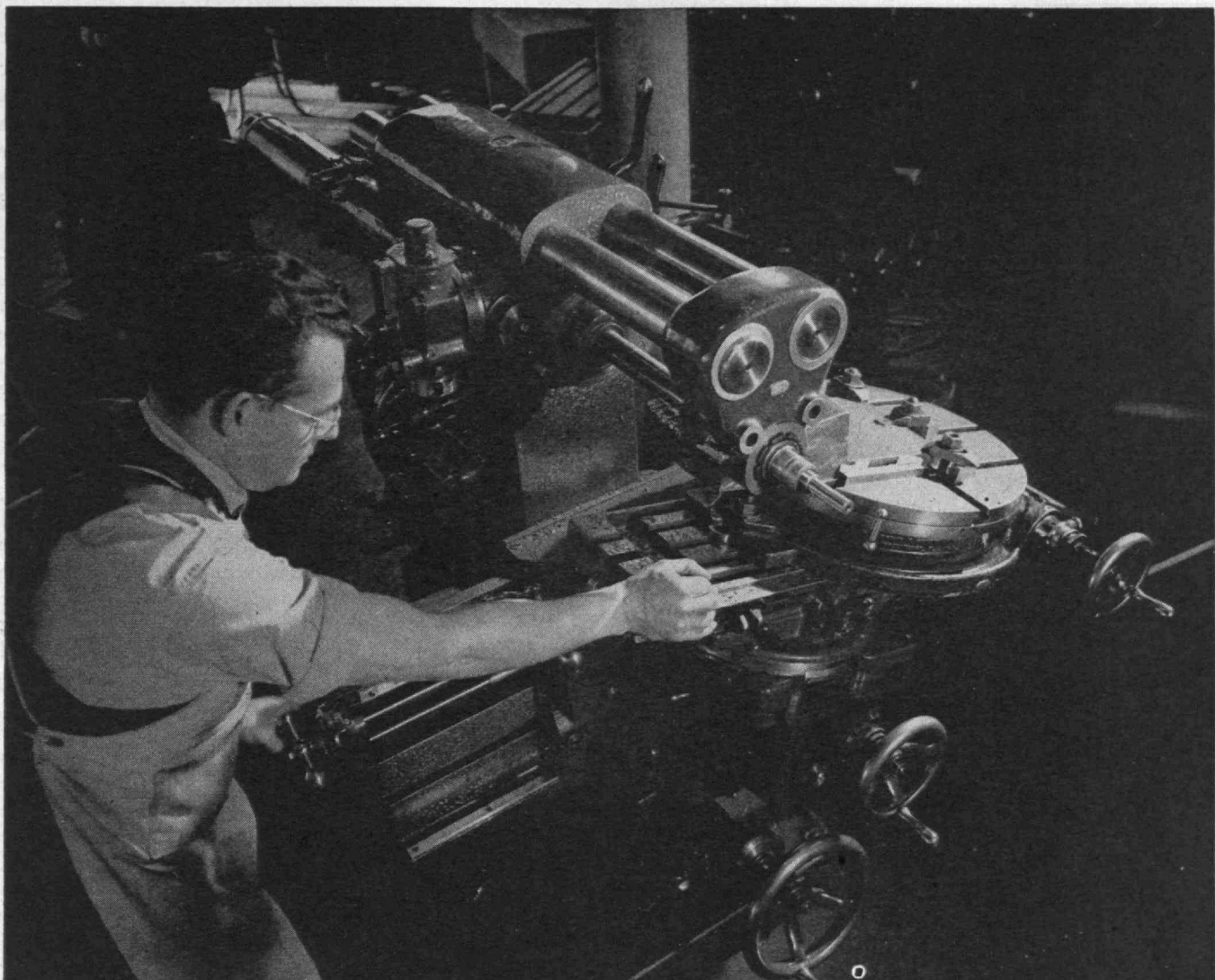
(Continued from page 204)

high-pressure engine was installed in her. The engine was of the triple-expansion type, with single-acting high-pressure and intermediate-pressure cylinders and a double-acting low-pressure cylinder. The extremely low piston speed of this engine, however, did not lend itself to the effective utilization of the Perkins system, and many mechanical difficulties were encountered in the use of steam at 450 pounds a square inch in such large cylinders. After a few years the Perkins engine was removed from the ferry as a failure.

In the meantime, however, C. J. Lambert ordered the large steam yacht *Wanderer* from Messrs. R. Steele and Company and directed that she be fitted with engines and boilers of the Perkins type. The *Wanderer* when launched was one of the largest steam yachts afloat, her length being 175 feet and her beam 29 feet. Her engines were designed by J. F. Spencer with the co-operation of Loftus Perkins, and were of the usual Perkins triple-expansion type, the diameters of the cylinders being 17 inches, 34 inches, and 48 inches, and the stroke of all pistons 30 inches. The high-pressure and intermediate-pressure cylinders were single acting, as was usual in Perkins engines. Steam was supplied by four Perkins water-tube boilers working at 400 pounds a square inch. The maximum indicated horsepower of the engine was 907, at 92 revolutions a minute. As might have been expected with such a large engine of an unusual type working at an almost unprecedented steam pressure, many serious mechanical troubles developed. The troubles encountered do not appear to have been caused, however, by the temperatures in the high-pressure cylinder but by details with which there had been no particular reason to anticipate trouble. The glands of the boiler feed pumps leaked persistently, which was very serious when one considers the absolute necessity of using distilled feed water in boilers working at 400-pound pressure. This difficulty was finally overcome by installing on the feed pumps auxiliary glands which caught the leakage from the main glands and returned it to the hot well. The flat mica water gauges of the Perkins boilers also proved very difficult to read, and there was a great deal of unexpected trouble with the slide valve of the low-pressure cylinder.

As this cylinder did not utilize steam at pressures which were at all unusual, it is unfortunate that this trouble contributed to the ill repute of the *Wanderer's* machinery. After correction of these initial difficulties, the *Wanderer* set out on a cruise which took her across the Bay of Biscay and into some exceedingly heavy weather which brought on further trouble with the power plant. Again it appears to have been details rather than fundamental mistakes in the design of the machinery that gave trouble. The most serious difficulty was caused as the vegetable black insulation in the sheet-metal casings of the boilers became compacted by the motion of the ship in such a way that practically no insulation was left in the upper parts of the casings. This fact resulted in the boiler room's becoming so unbearably hot that the stokers could not remain at work. The mica water gauges again proved unsatisfactory, and great difficulty was experienced in determining the water level in the boilers. Troubles experienced in this storm so thoroughly con-

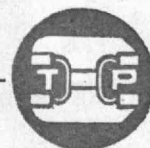
(Continued on page 228)



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HIGH-PRESSURE SALESMEN

(Continued from page 226)

vinced Mr. Lambert of the impracticability of the Perkins power plant that he had the engines and boilers removed from the *Wanderer* upon the return of the vessel to England. She was thereafter fitted with an ordinary compound engine using steam at a pressure of about 80 pounds a square inch.

In spite of the failure of the machinery in the *Wanderer*, Perkins induced Richard Power of London to go ahead with his plan for the installation of a Perkins engine and boiler in the little steam yacht *Anthracite* which was then under construction at the yard of Tchlisinger, Davis and Company of Wallsend-on-Tyne. The engine of the *Anthracite* was of the usual Perkins triple-expansion type and was built by Messrs. Hawks, Crawshaw, and Sons of Gateshead-upon-Tyne from designs by Loftus Perkins. The cylinder diameters were $7\frac{3}{4}$ inches, $15\frac{1}{16}$ inches, and $22\frac{1}{16}$ inches, and the stroke of all pistons 15 inches. The engine indicated 110 horsepower at 105 to 108 revolutions per minute. The water-tube boiler was built by the Perkins company in London. The *Anthracite* was a small vessel, her length on deck being but 84 feet, her beam 16 feet, and the depth of hold 10 feet. She measured 70 tons gross and 27 tons registered.

After a successful trip from the Tyne to London, the Perkins Engine Company invited a party of engineers to join the *Anthracite* for a demonstration run on the Thames. The little power plant was admired by those invited to witness this demonstration, and they were furthermore undoubtedly impressed by the results of tests made on the *Anthracite's* machinery by a prominent engineer, F. J. Bramwell, who reported that the engine and boiler produced an indicated horsepower-hour on 1.7 pounds of coal. Interest in the *Anthracite* was further promoted by the fact that her owner had consented to send her on a voyage to America with the avowed intention of demonstrating the practicability of the Perkins engine and boiler.

The little vessel left Falmouth in June, 1880, having 16 tons of coal in her bunkers and 6 tons in bags on deck. She arrived safely at St. John's, Newfoundland, in 18 days, during which she consumed $19\frac{1}{2}$ tons of coal under her boilers and 1 ton in the galley. The *Anthracite* experienced much bad weather on the trip, having to lay to for a couple of days, and on many others meeting heavy head winds and seas. On June 24 she left St. John's for New York, encountering so much fog that the trip was a slow one. While in New York her power plant underwent a rather elaborate test at the hands of naval engineers at the Brooklyn Navy Yard. This test did not, by any means, substantiate the claims of the Perkins Engine Company as to the economy of the power plant, the fuel consumption during the test being 2.7 pounds of coal per indicated horsepower-hour rather than the 1.7 pounds reported by Mr. Bramwell in England. The Perkins Engine Company, however, insisted that the poor showing was caused by improper use of the steam jackets. After completion of the tests at Brooklyn, the *Anthracite* made a short trip to Providence and Newport and then went to Philadelphia, from which port she sailed for England, passing the Delaware River lightship on August

(Continued on page 230)



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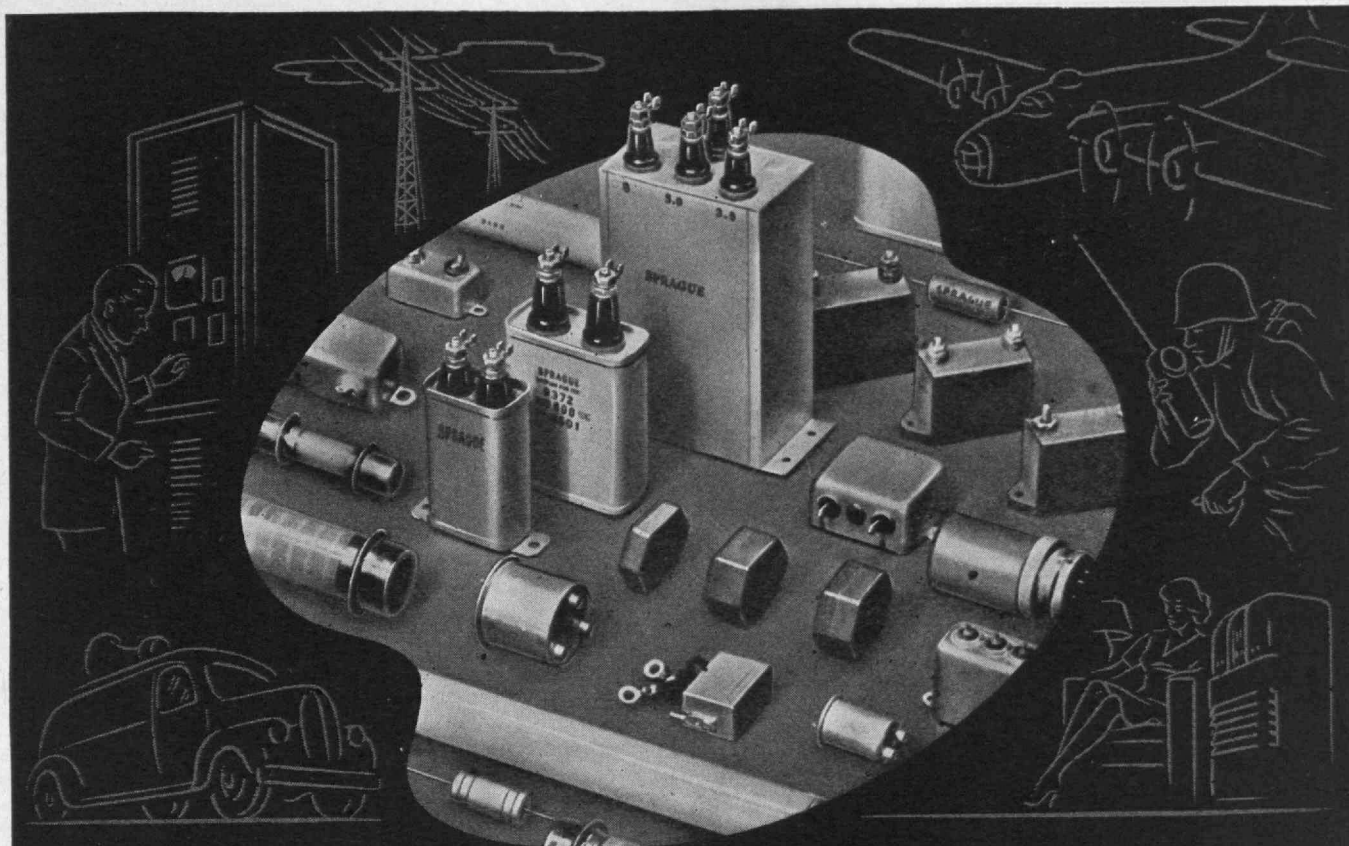
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HIGH-PRESSURE SALESMEN

(Continued from page 228)

22 and reaching Falmouth on September 14. Upon the return of the *Anthracite* to England, her power plant underwent another test which the company claimed substantiated their contention that her coal consumption did not exceed 1.7 pounds per indicated horsepower-hour.

Unfortunately, the benefit which the Perkins Engine Company hoped to realize from the voyage of the *Anthracite* was largely nullified by ill-advised and extravagant claims made in America by agents of the company as to the efficiency of her power plant. A bad impression was also made by the failure of the Perkins company to respond to a suggestion made by the Herreshoffs of Bristol, R. I., in a letter published in *Forest and Stream*. This read as follows:

We will be pleased to enter upon a friendly competition against the Perkins system of boilers and engines on board the *Anthracite* with our own coil boiler and compound engines on board the steam yacht *Leila*, upon such terms and conditions as may be mutually agreed upon. We hope, therefore, that an early reply to our proposition may be received from the owner or agents of the steamer *Anthracite*, as the questions of economy and speed are of vital importance to all steam users, and a better opportunity of determining to what extent steam can be expanded at a saving in fuel may not again be offered than during the stay of the *Anthracite* in our waters.

Very respectfully,

THE HERRESHOFF MANUFACTURING COMPANY

To this invitation the Perkins agents replied with a polite refusal, stating that the different size and power of the yachts made such a test impracticable. To engineers

(Concluded on page 232)



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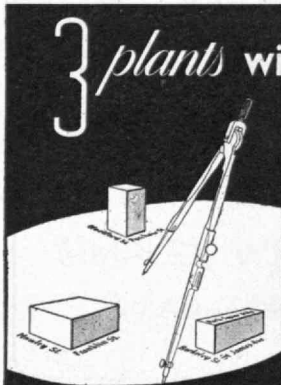
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HIGH-PRESSURE SALESMEN

(Concluded from page 230)

this was obviously an attempt to avoid what seemed to be a worth-while competitive test and undoubtedly the Herreshoff Company was justified in replying as follows:

To Major George Deane, Secretary,
Perkins Engine Company.

Dear Sir:

Yours of July 28th is received. We regret your declination of a practical test between the *Anthracite* and *Leila*. Although we recognize and appreciate the difference between the two vessels in point of speed, we still fail to see why a satisfactory test at the dock, if preferred, of twelve hours or more, could not be made, and the results so far as economy is concerned (it being a simple question of coal and horse power), be taken as reliable and convincing.

With the earnest wish that a fair and satisfactory trial may be still arranged, we remain,

Yours truly,

THE HERRESHOFF MANUFACTURING COMPANY

After the publication of these letters, *Forest and Stream* took up the question of the economy of the Perkins engine editorially and no doubt convinced yachtsmen of the extravagance of many of the claims made by agents of Perkins in America. At any event, no American firm appears to have purchased the right to build Perkins engines and boilers in the United States, and the voyage of the *Anthracite* as a promotion scheme must be reckoned a failure.

Though three generations of the Perkins family failed to develop their high-pressure steam engines and boilers to a state of perfection which could lead to the general acceptance of their system, we cannot but admire their faith in an idea which they felt to be fundamentally sound and which, in the light of recent developments in steam engineering, undoubtedly had merit. They should be remembered among the pioneers of high-pressure steam.

THE TREND OF AFFAIRS

(Concluded from page 194)

Territories of Canada. Discovered in 1930, the deposits had been actively developed before war made radium of even greater importance than usual by requiring it for treatment of instrument dials in night-flying planes. For each gram of radium extracted, the Canadian ores also yield 7,800 pounds of uranium. ☐ Paper has been adapted to become a substitute for wiping rags by the Navy. Tests show the new material to be superior to cloth for some purposes, though less speedy in the absorption of oil. Yearly, the Navy uses 65,000,000 pounds of wiping rags; 20,000,000 pounds of the paper substitute are expected to be used in 1944. ☐ From the pulp and seed which are waste products of cranberry jam factories, ursolic acid, a valuable emulsifying agent, is at present being extracted. Also recovered are cranberry wax and cranberry seed oil, both of which are commercially useful. ☐ Exploration along newly constructed sections of the Pan American Highway is proving fruitful; recently discovered 50 miles south of San José in Costa Rica is a fine stand of oak which is expected to produce 60,000 board feet to the acre. The trees run as large as eight feet in diameter, and have trunks 80 feet tall.

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THE INSTITUTE GAZETTE

(Concluded from page 210)

experiments conducted by Dr. Clark in her search for the soundest wire and the best metals for use in high-speed telegraph apparatus. One of her jobs is to select materials which are wear resistant and vibration proof. She works with complicated machines which magnify metals 2,500 times, so that she can find what stress and strain they can stand and perhaps develop better alloys for use in the important work of transmitting messages to the world.

In addition to her work with Western Union, whose metallurgical laboratory she founded in 1926, Dr. Clark is now serving as an engineering consultant for the War Department at the Frankford Arsenal, Philadelphia, Pa.

Dr. Clark has received a United States patent for electrical contacts suitable for high-speed service, British and French patents for steel, and two United States patents for a hardenable steel for such articles as dies, gears, cams, and tools. She has written many articles for the *Transactions* of the American Institute of Mining and Metallurgical Engineers, including: "A Study of the 470° C. Transition Point in Cast 60:40 Brass," in 1927; "A Study of the Heat Treatment, Microstructure and Hardness of 60:40 Brass," also in 1927; "Developments in Fatigue, Creep, Age-Hardening, Diffusion, Microscopy, Borocarbides, Powders, Electrode-Position and Die Castings," in *Mining and Metallurgy* in 1940; and "Metallurgical Problems in the Telegraph Industry," in *Mining and Metallurgy* in 1942.

In "American Men of Science" Dr. Clark is rated as an expert on nonferrous metallurgy and in copper alloys. She is a member of two committees of the American Institute of Mining and Metallurgical Engineers—those on rare and precious metals and on mining and metallurgy. She is also a member of the American Society for Metals and the New York Academy of Sciences.

A native of Glasgow, Del., Dr. Clark received an A.B. from Syracuse University in 1921, and then came to M.I.T. to study in Course III, from which she received the S.M. in 1922 and Sc.D. in 1926. She was a member of the Institute's instructing staff in the Department of Chemistry from 1921 to 1926. After receiving her doctor's degree, she entered the engineering department of the Western Union Telegraph Company, which was much impressed by her doctor's thesis, entitled, "A Study of the Heat Treatment, Microstructure and Mechanical Properties of 60:40 Brass."

Dr. Clark in private life is the wife of Robert L. Dietzold, '25. She is a member of the Cosmopolitan Club of New York and of the Appalachian Mountain Club. Her hobbies are skiing and mountain climbing and the study of early lead, copper, and steel.

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TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

SIGNIFICANT FIGURE

LAST SPRING, in the Fund's annual report for the year 1942-1943, appeared one short statement which caused many inquiries. That statement was, "During 1942 only four others bettered our total amount." What were those four college funds, and by how much were we bettered? With one exception, they were the same funds which also had greater numbers of contributors — Dartmouth, Yale, Harvard, and Cornell. Our Fund year ends on March 31. Many others close on June 30; and at that time one more, Princeton, had also passed our total. Here, then, is the way the six leading college alumni funds in the country shaped up last year:

| | |
|---------------------|-----------|
| Yale | \$260,541 |
| Dartmouth | 245,670 |
| Cornell | 185,132 |
| Harvard | 152,000 |
| Princeton | 117,020 |
| M.I.T. | 102,026 |

As you can see, there is a considerable differential between first and sixth place, but these figures, interesting though they may be, do not give a clear picture. They are complicated by such factors as the total number of alumni and the per cent of contributors.

Truly significant, however, is the size of the average contribution *per alumnus solicited*. That is a real comparison — and unfortunately a comparison which does not place our own accomplishment, encouraging though it may be, in a very high position. Those five other funds which led us in total amount had the following per capita figures:

| | |
|---------------------|---------|
| Dartmouth | \$12.30 |
| Yale | 7.90 |
| Princeton | 5.03 |
| Harvard | 4.11 |
| Cornell | 3.97 |

The Institute followed along with \$3.10, very close to Wellesley's \$3.07! That \$150,000 goal for which we are striving may seem a bit large to some. It represents an average of \$4.55 per Alumnus.

The Club Stakes

It's the last lap of The Technology Clubs Sweepstakes. At the turn Rhode Island, in second place last month, forged into the lead — by a very small nose. Otherwise the entries are running in the same order, except that a dark horse from Kansas City has suddenly appeared. It leaped right into the sixth spot (by a fractional amount not shown on the tally sheet) and is carrying a lot of weight.

Again, figures for most of the Clubs are well ahead of those for the alumni body as a whole: Eight of them lead in per cent of contributors, and six lead in average amount. It's a great race!

Here's the way it looked on December 31:

| | <i>Per cent of contributors *</i> | <i>Average contribution</i> |
|------------------------------------|---------------------------------------|---------------------------------|
| Rhode Island | 57 | \$13.80 |
| Western Pennsylvania | 55 | 13.30 |
| Philadelphia | 54 | 16.80 |
| Northern New Jersey | 49 | 12.85 |
| Cincinnati | 34 | 9.70 |
| Southwestern Association | 30 | 32.80 |
| Buffalo | 30 | 14.30 |
| Central Pennsylvania | 22 | 8.20 |
| Northern Texas | 18 | 8.80 |
| Alumni body as a whole | 25.5 | \$12.30 |

* Based on number of active members.

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to January 3 over 5,300 Institute Alumni, including 18 Admirals, one Commodore, and 63 Generals, were recorded as being in the active services of the United Nations. To date 42 Alumni have received military decorations.

Beginning with the November 1942 issue, The Review has included a listing of "M.I.T. Men at War." Corrections and additions to this list will be published in future issues. As a matter of convenience, promotions and corrections in the rank previously given are included under a single heading "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

Alumni are urged to write to their friends in the services. Letters addressed care of the Alumni Association, M.I.T., will be forwarded.

NEW DECORATIONS

- 1935 Bemis, Hal L., *Maj.*, U.S.A.,
Legion of Merit — Algiers.
- 1940 Zeamer, Jay, Jr., *Maj.*, U.S.A.,
Congressional Medal of Honor
for conspicuous gallantry as
pilot on an important aerial
photographic mission over for-
tified Japanese positions near
Buka, Solomon Islands, June
16, 1943.
- 1942 Kellogg, William W., *1st Lt.*,
U.S.A., Distinguished Service
Cross "for extraordinary hero-
ism in action in Italy."
- 1935 Struck, George R., *Lt. (j.g.)*
Dougherty, Edward K., *Lt.*
Freeman, John F., A.S.
- 1936 Hazeltin, Harry B., Jr., *Lt. (j.g.)*
Lippold, Benjamin F., Jr., *Ens.*
- 1937 Hanlon, John J., *Ens.*
- 1938 Weisberg, Eugene B., *Ens.*
- 1939 Hurt, Percy F., *Ens.*
Mulberry, Frederick L., *Ens.*
Schreiber, Alan P., *Lt. (j.g.)*
Helland, Erling O. J., *Ens.*
Yerkes, Francis H., *S.2c*
Ferris, Theodore V., *Ens.*
Jantzen, Alice C., *Ens.*
Meyers, Warren J., *Ens.*
Crutcher, Joseph A., *Ens.*
Ewing, John S., *Lt. (j.g.)*
Nagel, Albert H., *Ph.M.3c*
Plotenhauer, Fred D., *Lt. Comdr.*
Wittl, Casimir T., A.S.
Ajemian, Baret V., *Ens.*
Morrison, Richard B., *Ens.*
Rorschach, Robert L., *Mid.*

NEW LISTINGS

U.S.A.

- 1918 Bache-Wiig, John, *Capt.*
Herzstein, Joseph, *Sgt.*
- 1920 Gilliat, Leland W., *Lt. Col.*
- 1921 Ferry, Ronald M., *Maj.*
Gerarden, Karl E., *Pvt.*
- 1922 Duane, William, Jr., *Capt.*
- 1923 McQuiston, Charles F., *Maj.*
- 1924 Keith, Theodore K., *Capt.*
- 1925 Burbank, Wendell F., *Maj.*
Eager, Edward W., Jr., *Lt.*
Hobbs, Joseph R., *Maj.*
Thorndike, Benjamin A., *Capt.*
- 1926 Peterson, W. Winsor, *1st Lt.*
- 1930 Andrias, John, *1st Lt.*
Fontaine, Paul N., *Capt.*
Jandris, Ludwig P., *1st Lt.*
- 1931 Metcalf, William, *1st Lt.*
- 1932 Giddon, Elliot D., *Lt.*
Huessener, Richard, *Corp.*
- 1933 Blanchard, Joseph M., *Pvt.*
Chiminiello, Dominic J., *Maj.*
- 1934 Ball, Charles W., *Capt.*
- 1935 Golden, Gerald M., *1st Lt.*
McGoohan, Philip J., *Maj.*
Whitely, Frank C., *Capt.*
Yepsen, William G., *Lt.*
- 1936 Bobula, Paul F., *Pvt.*
- 1937 Herpers, Henry F., Jr., *Capt.*
Brettman, Herman, *Pvt.*
Carney, Frank E., *2nd Lt.*
Megquier, Carl E., *1st Lt.*
- 1938 Bausch, Carl L., *1st Lt.*
Connolly, Donald H., Jr., *Pvt.*
Hum, Jack K. Y., *1st Lt.*
- 1939 Lindsay, John, S., *Sgt.*
- 1940 Collins, David J., *Lt.*
Schneider, Jacob, *Pvt.*
- 1941 Dike, Robert S., *Capt.*
Pratt, Charles H., Jr., *Capt.*
- 1942 Fox, Philip E., *2nd Lt.*
Goldis, Alfred, *2nd Lt.*
Keyes, William F., *Pvt.*
Larkin, Mayo L., A.C.
Leventhal, Samuel L., A.C.
Simonds, John E., *Sgt.*
- 1943 Babcock, Alfred B., Jr., *Lt.*
Calabi, Eugenio, *Pvt.*
Dunn, Raymond A., *Lt.*
Falk, David M., *Lt.*
Lawson, Charles J., Jr., *2nd Lt.*
Milolajczyk, Edward P., *Pvt.*
Spencer, Kendall H., *2nd Lt.*
Telford, Worthington S., Jr., *1st Lt.*

U.S.N.

- 1902 Dickinson, Dwight, Jr., *Capt.*
- 1912 Wyman, Dwight M., *Lt.*
- 1918 Gifford, Robert L., *Comdr.*
- 1921 Skardon, Kenneth B., *Lt.*
- 1922 Haines, John R., *Lt. Comdr.*
- 1925 Bryant, Lewis L., *Lt.*
- 1926 Pournaras, George A., *Lt.*
- 1927 Henry, James T., *Lt. (j.g.)*
- 1930 Molloy, John J., *Lt. (j.g.)*
- 1931 Pritchard, Samuel B., *Lt. (j.g.)*
- 1933 Barkley, William H., *Lt. (j.g.)*
Rickards, Leighton R., *Lt. (j.g.)*
- 1934 Kut, Walter S., *Lt. (j.g.)*

★ Killed in Action.

† Missing in Action.

‡ Prisoner of War.

* Died in Service.

** Wounded.

U.S.C.G.

- 1939 Clift, Charles W., *Cadet*
- 1940 Benenson, Lawrence A., *Ens.*
Berry, Richard, *S.2c*

U.S.M.C.

- 1943 Shuchter, Gerard M., *Capt.*

CANADA

Army

- 1930 Huggard, Richard C., *Maj.*

Navy

- 1937 Hutchison, Alex M., *Sub. Lt.*

CHANGES IN RANK

U.S.A.

- 1922 Bauer, Morris M., *Lt. Col. to Col.*
Mowry, Charles E., *Capt. to Maj.*
- 1923 Crawford, James S., *Maj. to Col.*
Darby, Marshall E., *Capt. to Col.*
Metcalf, Walter A., *Lt. Col. to Col.*
Thomas, Atherton, *Maj. to Lt. Col.*
- 1924 *Brimberg, Isaac, *1st Lt. to Maj.*
Massari, Silvio C., *Capt. to Maj.*
Moore, Donald E., *Maj. to Lt. Col.*
- 1925 Meaker, O. Phelps, *2nd Lt. to 1st Lt.*
- 1927 Gerst, George S., *2nd Lt. to 1st Lt.*
Muchnic, George, *Capt. to Maj.*
- 1928 Kendall, Lee G., *Capt. to Lt. Col.*
Peirce, John B., *Lt. Col. to Col.*
Walsted, John P., *Capt. to Maj.*
- 1929 Lutz, Charles H., *Lt. to Maj.*
- 1930 Robbins, Charles, *Maj. to Lt. Col.*
- 1931 Roddy, Gilbert M., *Maj. to Lt. Col.*
- 1932 Condie, Churchill C., *T.3c to T.5c*
Gustafson, J. Elmer, *1st Lt. to Capt.*
- 1933 Negus, Philip E., *Pvt. to Sgt.*
Groff, John T., *2nd Lt. to 1st Lt.*
Lockman, Edward L., *1st Lt. to Capt.*
Roberts, Elton N., *Pvt. to Sgt.*
Smilg, Benjamin, *Capt. to Maj.*
Sweeney, John D., *Lt. to Capt.*
- 1934 Andersen, James R., *Maj. to Col.*
Gilman, Turner W., *Capt. to Maj.*
Haarman, Donald W., *Maj. to Lt. Col.*
- 1935 McMath, Hugh L., *1st Lt. to Capt.*
- 1936 Stone, Laurence A., *Capt. to Maj.*
Bracken, Frank L., *Lt. to Capt.*
Demakes, James P., *Pvt. to 2nd Lt.*

- Gilinson, Philip J., Jr., *Capt. to Maj.*
- Knight, Edmund C., *Sgt. to Capt.*
- Parkhurst, George A., *Lt. to Capt.*
- 1937 Souder, James J., *Capt. to Maj.*
Bakarian, P. William, *Lt. to Capt.*
- Barrett, Frank J., *Pvt. to T.5c*
- Davis, Douglas C., *Lt. to Maj.*
- Janson, Harry W., *Corp. to Sgt.*
- Smedile, Joseph A., *Maj. to Lt. Col.*
- 1938 Card, Bernard, *Capt. to Lt. Col.*
Cohen, Edward L., *W.O. to 2nd Lt.*
- Roper, Willard, *Capt. to Maj.*
- Schlansker, Howard I., *Capt. to Maj.*
- Wilson, John A., Jr., *Capt. to Maj.*
- 1939 Honnell, Pierre M., *Maj. to Lt. Col.*
Kirschner, Leo S., *Sgt. to T. Sgt.*
Lee, John C. H., Jr., *Lt. to Capt.*
Radnick, Burton D., *Cadet to 2nd Lt.*
- 1940 Saunders, Robert J., *Lt. to Capt.*
Taylor, Clark E., Jr., *Lt. to Capt.*
Barron, Julian M., *Pvt. to T.5c*
Campbell, James H., *Capt. to Maj.*
Crimmins, Francis J., *2nd Lt. to 1st Lt.*
DeMally, Charles V. F., *Lt. to Capt.*
- Ferullo, Harry A., *A.C. to 2nd Lt.*
- Goodell, Richard, *A.C. to Lt.*
- Isaacs, Irving W., *Pvt. to Sgt.*
- Johnson, Fred J., *2nd Lt. to 1st Lt.*
- Wilmarth, Clarence M., *1st Lt. to Capt.*
- 1941 Davis, Leighton L., *Lt. Col. to Col.*
Gill, Richard M., *Capt. to Maj.*
Gold, Arthur B., *2nd Lt. to 1st Lt.*
- Gott, Lester W., *Lt. to Capt.*
- Hansell, John E., *Lt. to Capt.*
- Howard, David W., *Lt. to Capt.*
- Koss, Irving, *Lt. to Capt.*
- Lyons, John F., Jr., *Lt. to Maj.*
- Nagle, John J., III, *Lt. to Capt.*
- Poor, Roger H., *Corp. to T. Sgt.*
- Richards, John C., *A.C. to Lt.*
- 1942 Card, Francis C., *A.C. to 2nd Lt.*
Carroll, Thomas S., *2nd Lt. to Capt.*
Greene, Bernard A., *Lt. to Capt.*
Hattenbuhler, George, *2nd Lt. to 1st Lt.*
- Hibbard, Charles, Jr., *2nd Lt. to 1st Lt.*
- Marsilius, Newman M., *1st Lt. to Capt.*
- North, Robert A., *Pvt. to Cadet*
- Ricker, Charles S., *1st Lt. to Capt.*
- Grandgent, Roland, *Cadet to Lt.*
- Kemp, Clinton C., *Pvt. to Lt.*
- McDonough, James O., *O.C. to 2nd Lt.*
- Maletskos, Constantine J., *Pvt. to 2nd Lt.*
- Verrochi, William A., *O.C. to 2nd Lt.*
- 1933 Donahue, Leamon F., *Lt. (j.g.) to Lt.*
- Hungerford, E. Arthur, *Lt. (j.g.) to Lt.*
- 1934 Blake, Samuel, *Ens. to Lt. (j.g.)*
Finneran, E. John, *Ens. to Lt. (j.g.)*
Merryweather, George E., *Lt. to Lt. Comdr.*
- 1935 Hawkes, William M., *Lt. to Lt. Comdr.*
Lawrence, Richard, *Ens. to Lt. (j.g.)*
- Freedman, Stanley M., *Lt. (j.g.) to Lt.*
- 1936 Hannam, Robert W., *Lt. (j.g.) to Lt.*
- 1937 Hershon, Sidney, *Ens. to Lt. (j.g.)*
Kahn, Charles R., Jr., *Lt. (j.g.) to Lt.*
Menal, Leon A., *Lt. (j.g.) to Lt.*
Palmer, Charles J., *Lt. to Lt. Comdr.*
Wingate, Roger H., *Ens. to Lt. (j.g.)*
- 1938 Beyerly, Irwin F., *Lt. to Comdr.*
Brown, F. William, *Lt. (j.g.) to Lt.*
Gordon, Robert S., *Lt. (j.g.) to Lt.*
Roosevelt, Cornelius V., *Ens. to Lt. (j.g.)*
- 1939 Donovan, Joseph J., *Ens. to Lt. (j.g.)*
Fairbrother, Horace W., Jr., *Lt. (j.g.) to Lt.*
Green, Jerome B., *Ens. to Lt. (j.g.)*
Hydeman, William R., *Lt. (j.g.) to Lt.*
- 1940 Conaly, Edward P., *S.K.3c to S.K.2c*
Dobson, Robert W., *Ens. to Lt. (j.g.)*
Eisman, Leon P., *Ens. to Lt.*
Hawk, Claude V., *Lt. to Comdr.*
Lackner, Peter R., *Lt. Comdr. to Comdr.*
O'Beirne, Emmet, *Lt. to Comdr.*
Olwell, Robert F., *Ens. to Lt. (j.g.)*
Reid, James H., *Ens. to Lt. (j.g.)*
Simpson, John B., *P.O. to Ens. (j.g.)*
- 1941 Brown, James A., *Lt. to Lt. Comdr.*
Cline, Cranmore W., *Ens. to Lt.*
Gavin, Joseph G., Jr., *Ens. to Lt. (j.g.)*
Gray, J. Cranston, *S.2c to Sp.3c*
Kellner, Robert L., *Ens. to Lt. (j.g.)*
Knapp, Richard P., *Lt. (j.g.) to Lt.*
Leonhardt, Alexander F., *Lt. (j.g.) to Lt.*
Mandil, Isaac H., *Ens. to Lt.*
Roe, Kenneth A., *Ens. to Lt.*
- 1942 Abrahamson, Ernest P., *Lt. Comdr. to Comdr.*
Andrew, William G., *Ens. to Lt. (j.g.)*
Cavanaugh, David J., *Ens. to Lt. (j.g.)*
Elkind, Vincent T., *Ens. to Lt. (j.g.)*

CASUALTIES

- 1918 Want, Cullen H., *Lt. Comdr. to Comdr.*
- 1923 William, Charles D., Jr., *Comdr. to Capt.*
- 1924 McMahon, H. Easton, *Lt. Comdr. to Comdr.*
- 1931 Janney, Samuel A., *Lt. to Lt. Comdr.*
- 1932 Juran, Nathan H., *Lt. (j.g.) to Lt.*
Spangler, Selden B., *Comdr. to Capt.*
- 1924 *Brimberg, Isaac, *Maj.*, U.S.A.;
killed in service, Nov. 25,
1943, Brookly Field, Mobile,
Alabama.
- 1940 *Downer, Delavan B., Jr., *Ens.*,
U.S.N.; killed in action July 4,
1943, U.S.S. *Strong* — Kula
Gulf.
- 1942 *Bardwell, Allan R., *2nd Lt.*,
U.S.A.; killed July 17, 1943, in
airplane crash in S.W. Pacific.

ALUMNI AND OFFICERS IN THE NEWS

Honor

¶ To GEORGE B. HARRINGTON '04, who this month will be awarded the William Lawrence Saunders Gold Medal for 1944 by the American Institute of Mining and Metallurgical Engineers for "distinguished achievement in mining of coal. . . ."

¶ To WILMER L. BARROW '29, who received in January the 1943 Morris Liebmann Memorial Prize given by the Institute of Radio Engineers.

¶ To LLOYD K. CLARK '38, major, Sanitary Corps, who received a citation of commendation from Surgeon General Norman T. Kirk for the development of a simple apparatus by which the Army may test the calcium hypochlorite content of purified water.

¶ To PHILIP FRANKLIN, staff, who was presented with one of the Townsend Harris medals of the associate alumni of the College of the City of New York on November 13, for his editorship of the *Journal of Mathematics and Physics* and his studies in algebra and calculus.

¶ To ERNST A. HAUSER, staff, who was elected a fellow of the New York Academy of Sciences in December.

¶ To WILLIAM HOVGGAARD, staff, emeritus, who on November 12 received the David W. Taylor Medal, highest award of the Society of Naval Architects and Marine Engineers.

New Assignments

¶ For SAMUEL C. PRESCOTT '94, serving as temporary chairman of the board of governors of the new Refrigeration Research Foundation.

¶ For MARCY L. SPERRY '00, appointed chairman of the utilities section of the District of Columbia War Finance Committee Payroll Savings Division.

¶ For FREDERICK G. CLAPP '01, now in Ankara, Turkey, as petroleum adviser to the Turkish Government.

¶ For WILLIAM M. VERMILYE '01, on November 12 chosen president of the Newcomen Society of England.

¶ For HAROLD S. OSBORNE '08, re-elected chairman of the standards council of the American Standards Association.

¶ For EDWARD D. MERRILL '09, elected president of the American Transit Association.

¶ For ROBERT E. WILSON '16, elected a director of the American Chemical Society.

¶ For JAMES A. PENNYPACKER '23, named temporary chairman of the

newly formed New England Association of Naval Architects and Marine Engineers; also holding office until the official elections are S. CURTIS POWELL '37, as vice-chairman; WILLIAM A. BAKER '34, as secretary-treasurer; WILLIAM F. BANNON '32, as a member of the executive committee; and EVERS BURTNER '15 and GEORGE B. CONNARD '25, as members of the advisory board.

¶ For BERNARD E. PROCTOR '23, chosen a member of the scientific advisory council of the new Refrigeration Research Foundation.

¶ For JAMES E. PEW '26, appointed director of the natural gas and natural gasoline division of the Petroleum Administration for War.

¶ For ADOLPH H. FEIBEL '32, elected chairman of the x-ray section of the National Electrical Manufacturers Association. He is also a member of the x-ray industry advisory committee of the War Production Board.

Publication

¶ By CHARLES H. HUGHES '00, *Handbook of Ship Calculations, Construction and Operation* (third edition), McGraw-Hill.

¶ By F. ALEXANDER MAGOUN '18, *Balanced Personality*, Harper.

¶ By JOHN A. ALLAN '12, "Geology," a report of the Research Council of Alberta.

DEATHS

* Mentioned in class notes.

¶ FREDERICK W. WOOD '77, December 23.

¶ ROBERT T. PAINE '81, November 12.

¶ ALFRED F. ROSENHEIM '81, September 3.

¶ ARTHUR B. PRENTICE '82, October 21.

¶ DONALD M. BLAIR '88, November 21.*

¶ ERNEST S. MAY '88, October 14.

¶ EDWARD M. SMITH '88, November 29.*

¶ CHARLES B. DODGE '89, August 21.

¶ JOSEPH H. FREEDLANDER '91, November 23.*

¶ JOHN M. JOY '91, October 12.*

¶ ARTHUR C. SMITH '91, August 7.*

¶ HERBERT A. THOMPSON '91, March 7, 1942.*

¶ CHARLES L. NUTTER '92, December 28.

¶ WALTER I. SWANTON '93, June 22.*

¶ ROLAND BAILEY '94, May 29.

¶ MAY BANTA '95, October 17.

¶ WILLIAM J. DRISKO '95, August 4.*

¶ WALTER R. PHEMISTER '95, May 22.

¶ FREDERICK W. ANDREW '96, December 25.

¶ MICHAEL V. LAHEY '96, August 3.

¶ WILLIAM D. SMITH '96, December 16.

¶ LUCIUS S. TYLER '96, November 1.

¶ WILLETT A. WOOD '96, March 5.

¶ THOMAS C. ATWOOD '97, February 2, 1943.*

¶ ROBERT E. KENDALL '98, November 18.

¶ FERDINAND A. BUTLER '99, November 15.

¶ HAROLD SMITHWICK '99, October 31.

¶ HOMER LITTLEFIELD '00, October 17.

¶ EDWIN S. WORDEN '00, July 1.

¶ SAMUEL L. WONSON '01, September 30.*

¶ WILLIAM H. HORSTMAN '02, April 24.

¶ GARDNER ROGERS '02, December 19.

¶ SIDNEY Y. BALL '03, September 10.*

¶ ANDREW R. COBB '03, June 2.

¶ WILFRED A. PAINE '03, October 5.

¶ GARRIT S. CANNON '04, November 29, 1942.

¶ LEWIS C. CLARKE '04, November 18.

¶ FRANCIS T. SCANNELL '04, February 25, 1943.

¶ WILLIAM A. CALDWELL '06, March 27.

¶ ALBERT F. BANCROFT '07, November 17.

¶ ALEXANDER ELLIS '08, November 5.

¶ H. MOORE RICHARDS '09, December 7.*

¶ CALEB S. BRAGG '11, October 24.

¶ BENJAMIN WHITE '13, June 13.

¶ GEORGE H. BURROWS '14, November 22.

¶ ARTHUR LEDERER '17, October 14.

¶ PERCY O. POTTER '17, March 5.

¶ GEORGE M. MACHECA '18, July 25.

¶ EARLE R. PICKETT '18, November 6.

¶ JOHN T. WHITMORE '18, December 14.

¶ WILLIAM A. BEVAN '21, July 5.

¶ WILLIAM H. LEONORI, Jr., '21, December 25.

¶ HENRY M. MULLINNIX '23, November 24.*

¶ LAURENCE L. DEFABRITIS '29, August 26.

¶ ARLEIGH T. BELL '30, June 30.

¶ M. MURRAY WAXMAN, Jr., '36, December 17.

¶ JAMES V. DOTSON '42, November 26.

¶ SHAO T. YUAN '43, October 16.

¶ MATTHEW MANK '43, April 15.*

¶ FREDERICK R. KNEELAND, former staff, November 9.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Hartford

The Club held its first meeting of the season at the University Club of Hartford on December 8. A fine turkey dinner was served, followed by the business meeting, which was presided over by Frederick O. A. Almquist '23, President.

It was voted that the President appoint an employment committee to assist members discharged from the armed forces in finding suitable employment. After the business meeting, the group adjourned to the Morgan Alleys for bowling. Later, some of the hardier fellows returned to the University Club for refreshments and a "tall story" session. Myron F. Burr '32, who arranged the program, is to be commended, for all enjoyed the evening immensely. — LOUIS J. PROULX, JR., '36, *Secretary*, 31 Wells Road, West Hartford 7, Conn. JOHN A. SWIFT '27, *Assistant Secretary*, Billings and Spencer Company, Corner Park and Laurel Streets, Hartford, Conn.

New Haven County Technology Club

Our second meeting of the year 1943-1944, on December 10 at 8:00 P.M. in the auditorium of the United Illuminating Company, was held in conjunction with the New Haven section of the American Society of Mechanical Engineers. Although 84 were present, only 12 members of the Technology Club attended. The A.S.M.E. is to be congratulated on its ability to get its members out.

The speaker was Sanford A. Moss, consulting engineer for the supercharger division of the General Electric Company at Lynn. He was introduced by Charles A. Williams '21, President of the Technology Club. Dr. Moss's subject, "Aviation Comes Through," was very interesting as well as instructive. He had a large number of slides to illustrate what the turbosupercharger is doing in aviation. — NATALE GADA '26, *Secretary*, General Electric Company, 129 Church Street, New Haven, Conn.

Niagara Falls Technology Club

A meeting of the Club was held on December 16. After a fine dinner, we sang some Tech songs. Lauren B. Hitchcock '20, President, then read some interesting excerpts of Institute news in letters received from the Alumni Secretary. The new Secretary of the Club was called upon to summarize briefly President Compton's annual report, in which he told about the various wartime activities at Technology. New officers were elected as follows: President, Raymond G. Brown '16; Vice-president, J. Frederic Walker '25; Secretary-Treasurer, William H. Hope, Jr., '36.

T. Francis Twomey '33 showed colored movies of the new buildings at the Institute and also some excellent shots of the new pool, the dinghies, and the crew. It was a fine meeting, and the pictures proved most interesting to all of us. — WILLIAM H. HOPE, JR., '36, *Secretary*, Gilman Fanfold Corporation, Niagara Falls, N.Y.

Washington Society of the M.I.T.

The Society held its December meeting on the ninth at the Y.W.C.A. Meetings have been arranged for the second Thursday of every month, January through May, at 6:30 P.M. at the Y.W.C.A., 17th and K streets. Visitors are cordially invited to attend our dinner-speaker meetings and to enjoy the fellowship of Technology men in Washington. E. D. Merrill '09, a former President, presided in December in the unavoidable absence of Merton Emerson '04 and Bill MacMahon '22.

Brigadier General Albert J. Browning '22, director of the purchases division in the War Department, had many thoughtful things to say on the subject of "Postwar Opportunities for Engineers." "The big question to me," he said, "is how efficient are we going to be in the future? . . . If we could retool and re-equip and rebuild American industry, we could increase our efficiency. . . . The logical question then is: If this is true, why doesn't industry go ahead and do it? Industry was doing this at a moderate rate until the war. However, with the present high income taxes, wherein the government will take away a large percentage of the profits and the contractor must still meet all the losses, the possible gain as against the possible risk is so small that in my opinion few important improvements will take place in manufacturing for some time to come. . . ."

The following M.I.T. men heard General Browning: 1887: G. H. Parks; 1889: G. W. Stone; 1890: J. G. Crane, W. B. Poland; 1891: A. J. Hammond; 1897: P. L. Dougherty, F. A. Hunnewell; 1898: Martin Boyle; 1902: A. H. Sawyer; 1903: Hewitt Crosby; 1904: A. M. Holcombe, F. W. Milliken; 1905: O. C. Merrill, R. E. Tarbett; 1907: Allen Pope; 1908: P. H. Heimer; 1909: B. A. Robinson, M. R. Scharff; 1911: W. H. Martin, C. G. Richmond; 1912: F. W. Barker, E. C. Holbrook; 1915: A. D. Beidelman; 1919: A. H. Blake, L. J. Grayson; 1921: L. W. Conant, Richard McKay, W. T. Smith; 1922: H. H. Fisk, G. R. Hopkins, C. A. Moore, J. H. Teeter, R. K. Thulman; 1924: J. D. Fitch, P. C. Maynard, C. W. Riva, W. W. Sturdy; 1925: E. M. Lee, H. E. Wehmler; 1926: S. J. Cole, E. W. Eddy, E. J. McGrew, Jr.; 1927: E. G. Cowen, G. C. Popps, G. E. Thomas; 1928: A. E. Beitzell, J. W. Gaffney; 1929: N. P. Stathis; 1930: C. W. Maskell, J. A. Mathews; 1932: W. H. Foster, G. A. Lowery, F. M. Moss, R. S. Prescott; 1934: S. van T. Jester, Jr., R. B. Jewett, S. T. Martin, Jr.; 1936: H. C. Johnson, S. T. Johnson, H. F. Lippitt, 2d, B. W. Lowe, W. A. Stiles, Jr.;

1940: D. R. Telesca; 1942: Z. W. Wilchinsky; 1943: A. F. Hillhouse, Jr. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. WILLIAM K. MACMAHON '22, *Review Secretary*, Rosslyn Gas Company, 3240 Wilson Boulevard, Arlington, Va.

CLASS NOTES

1888

Marion Talbot, who lives on Chicago's South Side, was met out walking within the past year by Lonsdale Green '87. Our most illustrious coed, Dr. Talbot has received more degrees, we believe, than any other graduate of the Institute: She received an A.B. from Boston University in 1880 and an A.M. in 1882; an S.B. from Technology in 1888; and three LL.D.'s. Born in Switzerland in 1858, she taught domestic science, sanitary science, and household administration at Lasell, Wellesley, and the University of Chicago. She was dean of women at Chicago for 33 years; secretary of the Association of Collegiate Alumnae for 13 years, president for two years; and acting president of Constantinople College for Women in 1927-1928 and 1931-1932. She is author of books on education, household administration, and sanitation, is a fellow of the American Association for the Advancement of Science and of the American Public Health Association, and is a member of the American Historical Association and other organizations. In 1936 she brought out her autobiography, *More than Lore*. What a woman! We are proud to belong in the same Class with her!

Thomas E. Linzee of the United States Army Air Forces, son of our John W. Linzee of Beacon Street, Boston, was married to Elizabeth Y. Howard last October at Laredo, Texas. — We have to record the passing of Captain Donald M. Blair on November 21 at his home, 17 Blake Road, Brookline. He was in the building-moving business practically all his life. His wife died about a year and a half ago. Blair was a military officer from the top of his head to the soles of his feet. Though he seldom met with the Class, we all admired him for his good qualities and soldierly bearing.

Edward M. Smith of North Hampton, N.H., went to his reward on November 29. For half a century he was construction engineer for the Boston and Maine and also for the same period of time deacon in the Congregational church of his home town, of which town he was also tax collector.

On January 26 your Secretary talked to the Old Guard of Princeton, N.J., on his work in the design, construction, and operation of steam-electric power plants and his experiences in the Illinois Naval Reserve and in the United States Navy. — BERTRAND R. T. COLLINS, *Secretary*, 39 Wiggins Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston 15, Mass.

1891

Arthur Carleton Smith died on August 7 at St. Paul, Minn. He was with us at the Class Day luncheon on our fiftieth, and few if any of us had seen him over that long period since graduation. We know he had been interested in poultry raising for many years and had taught poultry husbandry at the Minnesota University farm. His wife must have died previously, as all mail has been returned.

Joseph H. Freedlander died in New York on November 23. He had been a well-known architect in that city for many years. The following obituary is from the New York Times of November 24: "Joseph H. Freedlander of 245 East Seventy-second Street, architect of the Museum of the City of New York . . . died . . . of a heart attack. . . . He was seventy-three years old. . . . Born in this city, he was graduated . . . from the Ecole des Beaux Arts in Paris. Years later he served as president of the Society of Beaux Arts Architects here and as a member of the society's prize committee.

"Among the New York structures designed by Mr. Freedlander are the Importers and Traders National Bank, the new Harlem Hospital, the Fifth Avenue traffic towers, the French Institute in the United States, at 22 East Sixtieth St. and, in association with Max Hausle, the Bronx County Court House and Jail. His works elsewhere include . . . the new buildings of the Saratoga Spa at Saratoga Springs . . . the Portland, Ore., Auditorium, and the Perry Memorial at Put-in-Bay, Ohio. . . .

"As president for more than ten years of the Allied Arts Federation . . . Mr. Freedlander frequently gave public expression to his architectural opinions. Speaking before the Allied Artists of America in 1933 he said: 'The era of the remarkable manifestation termed "Modernistic" is about to end. In so far as it applies to architecture it started abroad, rolled over these shores and is now fast receding, but one of the most curious impressions it has left in its wake is that if a building has the semblance of good looks, or be at all pleasant to gaze upon, it is classified as old-fashioned, although it may be of the very essence of modernity. Let us not be led astray by the propaganda of "mechanization." The machine age has benefited mankind in industry, agriculture and manufacture. But it has no place in the fine arts.'

"Mr. Freedlander was an academician of the National Academy of Design, a Knight of the French Legion of Honor, a member of the American Institute of Architects, Architectural League of New York and the Players. He leaves a widow, Gladys Weber Freedlander, whom he married in 1937, and a son by his first wife, Ronald Freedlander, who is with the Office of War Information in New York."

The death of John M. Joy on October 12 was reported in the New York Herald Tribune of October 13: "John Marston Joy, retired electrical engineer who worked on the development of talking motion pictures, died . . . in Yonkers, N.Y. He was seventy-five years old and lived at 12 Shelley Ave., Yonkers. Mr. Joy received his technical training at Cornell University and M.I.T. and he came to New York as an

electrical and technical expert. In 1925 he became associated with William Fox, film producer, and worked on the development of motion-picture sound effects. He retired several years ago. His wife, Mrs. Eleanor Bressel Joy survives."

Only recently we received notice of the death of Herbert A. Thompson in Amherst, Mass., on March 7, 1942. We have heard from him off and on over the years, but we have not seen him at any of our reunions. Harry Young wrote to Mrs. Thompson, and the following information is taken from her letter: "Herbert was born in Milford, Mass., on May 13, 1867, the son of Edmund and Louise Francis Thompson. . . . After being graduated from M.I.T. in 1891, he took a course at General Electric, getting his diploma in '93. He taught at Iowa Wesleyan for a year or two, and then returned to Amherst College to make apparatus for the college under Professor Garman's leadership. In 1902 he joined his father in a hardware and repair business on South Pleasant Street, Amherst, and remained over 40 years in the same place. He retired from business in 1938 on account of ill-health. We have no children."

A class dinner was held at the Algonquin Club, Boston, on December 10. There were ten of us and two guests — Horace Ford, Treasurer of M.I.T., and Harry Clifford, our honorary member. Classmates attending were Bradlee, Clark, Cole, Damon, Dana, Fiske, Howard, Ryder, Wilder, and Young. Channing Brown had expected to come but was housed with a cold. Steve Bowen had left a few days before for Winter Park, Fla.

After the usual satisfactory dinner, we had a most interesting talk by Horace Ford, outlining some of the government activities and research work at Technology. Though their scope and value to this country in prosecuting the war are hard to grasp, we may well be proud of the important position held by our alma mater, probably second to none. Anyone who has heard Horace Ford talk in his informal manner will understand our comment that he can express and cover more important and interesting matters clearly and concisely in a given time than anyone else we know. We enjoyed him immensely and thank him for attending our dinner. We elected him an honorary member of our Class, which we tried to explain entailed no obligation whatever on his part. We really would like his help in guiding our youthful contingent of sons and grandsons who have gone to the Institute and whom we consider as ex officio honorary members of the Class.

The Secretary reported that of our original list of 315, of whom 102 were graduated, about two-thirds have either died or disappeared, and that of the remaining third, about half are not interested in class or Technology affairs.

Of the 60 or so on our active list, we heard from about 75 per cent, many of whom sent their best wishes and regretted that they could not attend. Of the Coast contingent, we heard from Hersam, Leeland, Alley, Kimball, and Garrison, a group most loyal to '91 and M.I.T. We had messages from Walter Douglass in Daytona Beach, Hopton in Syracuse, Arthur Pierce in Pittsfield, George Atkinson in Summit,

N.J., Henry Birks in Montreal, George Spooner in Maplewood, N.J., Albert Pierce in New Bedford, Clouston Moore in Illinois, Lewis Dunham in New York City, John Putnam in New Haven, and so on. Barnes, Dart, Forbes, and Thompson could not attend on account of ill-health, and Francis Holmes was just out of the hospital but coming along all right.

Hartley White wanted to know whether any of our men were in the vicinity of Mount Dora, Fla., where he has gone for the winter. "I have to be in a warm climate to be active," he wrote, "and I am active here. I have three acres, two of which are tangerine groves, heavily loaded."

Ed Smith sent greetings from Providence: ". . . To miss the meeting is a calamity to me. I presume that most of the boys are busy with war work. The two concerns with which I am associated have been doing their bit, but only one of them has received direct government orders. Neither can boast award of an Army-Navy 'E,' but numerous customers have the award and we have been credited with help in achieving it. . . . We hear a lot and read a lot about the amazing comforts to be evolved from the experiences of war production. If anyone thinks (as in '29) that a new era of *dolce far niente* has arrived, he has another guess. Eve Curie recently uttered a statement to the effect that the salvation of France lies in hard work. So does the salvation of America, of the world. . . ."

From Harry Young, we received the following news: ". . . I had another great-grandchild born in Harrisburg, Pa., on November 17. This time it's a boy, George Roberts Clay. . . . One of my grandsons is at Maxwell Field, Ala., in a preflight air-training field for pilots. The other grandson, just 18, is still in New York, and has signed up, but so far they haven't called him."

Before leaving for Havana, Charlie Ricker wrote from Salamanca, N.Y.: ". . . I am better than when I wrote you last, but the weather is growing cold and I feel it. My doctor in Cleveland told me a winter in Cuba would probably put me back in old form, and I am anxious to get started, but the preliminaries — closing the house, packing, and red tape for foreign travel — are a big job for me now. On the way I plan to spend ten days or so with my son and his family in Arlington, Va. My address in Havana will be the same as before — P.O. Box 1715, Havana, Cuba."

From Robert Ball in Cambridge, England, came the following letter: "It was a joy to look upon your writing again, bringing your good wishes, class news, and the best of tidings of yourself. But I have to mourn another old friend with the passing of Eli Bird, whose conspicuous talent has brightened the pages of our class publications almost from the time when we looked upon the embellishment of his notebook in the lecture room. The propinquity due to alphabetical order assisted me in this!

"Your offer of the class notes is accepted with gratitude. No 'hands across the sea' movement could be more acceptable than the periodic reception of the thoughts and experiences of my colleagues among the Council of Elders; for such the years proclaim us to be. We are all getting along. Here is a guess at the average age: It is represented by a number unique among two-

Have you made your reservation for Alumni Day, Saturday, February 26?

1891 Continued

digit numbers, for it is the only one that has the following properties — it is a prime number and is the sum of two squares and, if the digits are reversed, the number so formed is also prime and the sum of two squares . . . !

"My only daughter was married this year. Her husband is a civil engineer and has just completed the erection in Africa of a large factory for the dehydration of vegetables; there is only one larger in existence. It is needless to say in what country that is to be found! You need not guess; you know. My son's widow has married again . . . ; the grandson is flourishing. If the fates should bring your grandson this way, tell him our door is wide open for him and he must inform us of his coming. We will do anything we can for him should he give us the opportunity."

Gorham Dana has been active in Brookline, Mass., town affairs for many years. He has recently been elected a member of a long-range planning committee. His picture appeared in the Brookline *Citizen* of October 7, and that paper had this to say of Gorham's activities: "Lastly, we have Gorham Dana whose name might well be Gorham 'Planning Board' Dana. It is practically impossible to think about planning for Brookline without thinking about Gorham Dana. What this man does not know about planning in all its phases is probably not worth knowing at all. He was such an obvious choice for the post-war planning committee that there was scarcely a ripple of excitement when his name was announced recently. Incidentally, it should be stated here and now that this sterling citizen's contribution to the betterment of Brookline is by no means measured exclusively by his work on the Planning Board, of which he is chairman."

In a recent letter, Charlie Hanington said: ". . . I always read the class news in The Review with great interest. We have started our winter lectures here at the Colorado Museum of Natural History, and I am enclosing a program so that you may see the fine talent this season. . . . We are doing our share to entertain during these trying times."

Carleton Read wrote from Worcester: "Giff Thompson tells me that I am growing old, that I am only three weeks younger than he is. So I thought I had better stay at home and not take the long trip from Worcester to Boston. I called on Giff in April and again in October. He is the same old sport. Call and see him; he lives in Gorham Dana's town. Another sign of old age is that last month I joined the great-grandfather club. The last is the outcome of a trip that Jim Swan and Ed Miller took with me 50 years ago to assist in a high-noon ceremony in which I took a more or less important part. My son was in Washington for three months with his New York boss, A. D. Whiteside. . . . He had a two-and-one-half-hour luncheon with Swan, who, he says, is in good shape except that his old eye trouble still bothers him. I had a letter from Clouston Moore a short time ago, telling me that I was the first of the Class to get the 50-year certificate of the American Society of Mechanical Engineers. For all that I am a great-grandfather, 50 years married, 50 years in the A.S.M.E., and so on, I can still walk a plank to wash and whiten paint, and paper

the room and paint the house or do a job of piping. Last summer I spaded up part of my lawn and had a garden. . . . Some of the ladies of the neighborhood say that I should not be up on a ladder painting, but Mrs. Read does not join with that idea. Remember me to the boys, and put me down for the 55th."

A recent letter from Arthur Alley has just come in. He says: "My life is an even pace, without much excitement. I haven't heard anything about Kimball, Viele, or Garrison for over a year. You see, they live over 100 miles north of where I live and we don't travel so much as we did formerly. San Diego is a very busy place now. Since I came here 20 years ago, it has grown in population from 80,000 to about 400,000. We all wonder how many will remain here when normalcy comes again. We have many camps, and the members of the Marines, the Coast Guard, the Signal Corps, and so on, are always in evidence. The ack-ack and boom-boom are constantly heard. . . ." — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

1893

In honor of the golden wedding anniversary of Mr. and Mrs. Charles V. Allen, their son and daughter-in-law, Mr. and Mrs. Howard V. Allen, gave a tea on Sunday afternoon, January 2, at the Engineering Woman's Club, 2 Fifth Avenue, New York City. — Cadwallader Washburn and Mrs. Margaret Cowles Ohrt were married at Manchester, N.H., on Sunday, October 17. Simultaneously with the announcement of the marriage, the Secretary received the following letter from Washburn: "In view of my profound silence, this note will undoubtedly startle you. I read with much interest in The Review for November your contribution discussing the eventful 50th reunion, but I confess not unmingled with humiliation and disappointment that fate prevented my participation on the occasion. Owing to increasing scarcity of labor during the restoration of my house in Maine, I simply could not leave the place during the month. . . . Under another cover goes an announcement which I expect will stun you. No? We have taken an apartment at 8 North Street, at the corner of Elm and North streets, for the duration of the war. Do you know Manchester? It is a very beautiful, small city. I am enchanted with it. It offers inexhaustive material for an artist. . . ."

Fred Fay and Charles Spofford of the engineering firm of Fay, Spofford and Thorndike announce that the firm's New York office is now located at 733 Graybar Building, 420 Lexington Avenue, New York 17, N.Y. Bion A. Bowman '09, who for the past three years has been resident partner, engaged in war work for the United States Army in Newfoundland, is in charge of the New York office.

In a recent issue of the Boston *Traveler*, under the heading "Our Gracious Ladies," appeared the following sketch of Nancy Claflin Keyes, daughter of Mr. and Mrs. Frederic H. Keyes: ". . . As head hostess at the Officer's Club, which now occupies the headquarters of Harvard's famed Hasty Pudding-Institute of 1770, she is responsible for the hostesses for each evening, and must see that the Saturday

evening dances run off in good order. . . . Recently awarded a silver bowl for her work at the Hasty Pudding, Nancy thinks the club is one of the most democratic officer's clubs anywhere, for Pudding members still use the premises and, consequently, non-commissioned men often are dancing about the floor along with their superior officers. However, the club is limited to men stationed at Harvard and M.I.T. A tall, slender, grey-eyed ash blonde, Nancy was born in Newtonville but lived most of her childhood in New York city and was graduated from The Spence School and Vassar, where she majored in music. Now back in her native town, she and her parents, Mr. and Mrs. Frederic H. Keyes, live in the house which her great-grandfather, the late Gov. Claflin, occupied. . . . An accomplished pianist, Nancy teaches pianoforte. . . . Sportswise, she enjoys tennis, sailing (which she has done during her many summers spent in Gloucester) and canoeing. . . ."

Willis T. Knowlton, formerly sanitary engineer of the Bureau of Engineering at Los Angeles, has retired from his municipal work. His home address is 1632 South Van Ness Avenue, Los Angeles 6, Calif. Following his graduation with the Class, Knowlton was for a few years assistant engineer in the city engineer's office of Medford, Mass., after which he was employed by various consulting engineers in the East. For two and one-half years, until 1901, he was assistant engineer for the Hawaiian Government in charge of sewerage and drainage systems for Honolulu. Returning to the States, he was for a time associated with the engineering firm of Herring and Fuller, on hydraulic and sanitary engineering work in the East. In 1905 he became assistant city engineer in charge of sewers for the city of Los Angeles, the position in which he remained (with change of title) until his retirement. Charles M. Spofford, as vice-president of the American Society of Civil Engineers, attended a recent meeting of the society in Los Angeles and had an interesting meeting with Knowlton, whom he found hale and hearty and not much changed in appearance from our student days.

For many years during his long residence in Washington, Walter I. Swanton was a most active member of the Federation of Citizens' Associations of the District of Columbia. This association, at its meeting on November 18, adopted the following resolution: "The Federation of Citizens' Associations has learned with great sorrow of the death, on June 22 last, of Walter I. Swanton, a former delegate. At the time of his death he was visiting his brother, Henry A. Swanton, in Newton, Mass., having attended the 50th reunion of his Class at Technology. Mr. Swanton was a resident of Washington from 1903 to 1941, when he retired from the government service and moved to Ohio to live with one of his daughters. . . . Mr. Swanton brought to his civic work his engineering training and native analytical talents. At various times he made investigations and reports on such matters as public utility problems, refuse disposal, fiscal affairs, assessments and taxation, land purchases, and so on, all without compensation of any kind other than the consciousness of a job well done and the appreciation of his fellow

1893 Continued

citizens. . . . The community has suffered a great loss in his passing. . . . — FREDERIC H. FAY, *Secretary*, 11 Beacon Street, Boston 8, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston 16, Mass.

1895

We learned recently through a letter from Gene Clapp, our Class Agent, that William Johnson Drisko, VIII, passed away on August 4. He was born at Addison, Maine, on September 8, 1866. Bill was known to many of us as Professor Bill Drisko. After completing his work at the Institute, he began his lifework in the teaching profession and continued therein until his retirement from the staff at Technology several years ago. The first year after graduation, he started as an assistant and for three years following he was an instructor in physics. During 1899-1900 he was professor of physics at Colby College. From 1901 to his retirement he was associated with the instructing staff at M.I.T. — from 1901 to 1905 as instructor, 1905 to 1910 as assistant professor, 1910 to 1923 as associate professor, and from then, until his retirement, as professor of physics. Following his retirement in 1935 he located on his farm in Addison, Maine, at which place he passed away. Drisko had two sons who were graduated from Technology: Benjamin '23 and John '27.

Henry D. Jackson of Concord, N.H., advises that he has included general engineering consultations with his services as manufacturing agent for packings, valves, and other operating equipment. His only son has recently attained the rank of first lieutenant in the Army.

Al Sloan addressed the recent gathering of the Second War Congress of American Industry at the Waldorf-Astoria in New York City, saying in part: ". . . Expanding job opportunities are a social, political, and economic 'must' in the postwar era. The evidence of that is clear. We must recognize that demand, and in doing so we must bear in mind that the sole instrumentality by which it can be met in a free economy is a virile and expanding system of enterprise. Increased numbers of job opportunities must be provided by developing new things to produce and producing existing things at lower prices. . . ." — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

At the time these notes are being written, the old year is approaching its end, and the Secretaries seem to have run very low on news. We can always depend upon Admiral Bakenhus to be doing something of interest. The New York *Sun* of December 2 referred in most favorable terms to the survey made by Bakenhus on the proposed Harlem River Drive. He found that the proposed drive would have a very serious effect on business in that it would bring about the loss of a mile and a quarter of river frontage which would be felt keenly by the shipping business. Last month these notes listed some of Bakenhus' activities. This list can now be amplified to include the facts that he is a member of the board of direction, chairman of the retirement system committee, and chairman of the committee on bearing value of pile foundations,

American Society of Civil Engineers; chairman of the student chapter committee and member of the hospitality committee for the metropolitan section, American Society of Civil Engineers; president and member of the council, American Institute of Consulting Engineers; member of the board of directors, Society of American Military Engineers; member of the board of directors of the New York City post, Society of American Military Engineers; vice-president and chairman of the membership committee, American Shore and Beach Preservation Association; and fellow, American Association for the Advancement of Science. The statement last month that he was commander of the Military Order of the World War was incorrect and should have read that he is commander of the New York chapter of the Military Order.

Bakenhus has wired that the New York classmates are giving an informal dinner for Charlie Locke and Johnny Rockwell on Wednesday, February 23, at 6:30 P.M. in the President Tavern, Lexington Avenue and 41st Street. Out-of-town classmates are invited to join by notifying Bakenhus at 142 Maiden Lane. But come anyway.

Aldrich Northup, son of Ed Northup, was scheduled to be the recipient of the '96 class scholarship at M.I.T., but Ed's widow Louise, who still continues to maintain the family home in Pensacola, Fla., has recently written that Aldrich has become a sophomore in Duke University. He was one of the fortunate students who passed a special examination for entrance to Duke University in January, 1943, five months before he was graduated from Pensacola High School. When he arrived at Duke, he passed all necessary tests and was accepted for the V-12 Navy program, where he is listed as a premedical student. Ed's oldest son, Eugene, 29 years of age, is a second lieutenant in the Marine Corps at Quantico, Va., and the third boy, William, 23, is a lieutenant, junior grade, on a submarine in the Pacific. He was graduated in mechanical engineering from Georgia Tech in 1942. Not only are the children serving their country, but Mrs. Northup herself is, as she says, doing her bit to keep the home fires burning by participating in United Service Organizations and Red Cross work.

Our genial host and honorary member of the Class, Charles Henry Brown, proprietor of East Bay Lodge, passed away in Swampscott on December 12 at the age of 70. This column had previously reported his retirement on account of ill-health a year ago, and he had apparently taken up his residence in Swampscott. He is survived by his widow, whom we also remember as the charming hostess at East Bay Lodge. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1897

Your Secretary has received a copy of Memoir 1308 issued by the American Society of Civil Engineers relative to Thomas Clark Atwood, who died on February 2, 1943. We wish that we could publish it in this column, but limitations of space forbid. It is a glowing tribute to the character and lifework of our classmate. Possibly anyone so desiring can obtain a copy from the Secretary of the A.S.C.E.

George R. Wadleigh, who is most faithful in sending us notes for the class news, writes us of making a trip on one of the new 2,300-ton destroyers that are being built at the Bath Iron Works. The fact that this particular destroyer was named after George's father made the trip all the more memorable.

Come on, you fellows, if you wish to read any news items in this column, you must do your part and send them in. Your Secretary is no ghost writer. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

1901

Lammot du Pont, chairman of the board of E. I. du Pont de Nemours and Company, presided at the opening session of the Second War Congress of the National Association of Manufacturers on December 8. — At the annual meeting of the stockholders of the Philadelphia National League baseball club in November, announcement was made that Robert R. M. Carpenter, Vice-president of E. I. du Pont de Nemours and Company, had bought the shares (believed to be 62 per cent) owned by William D. Cox, former President of the club, and that R. R. M. Carpenter, Jr., his 28-year-old son, had been named president of the Phillies. Young Carpenter, a former football star and President of the Wilmington Blue Rocks in the Interstate League, may not take over active control of the club until after the war, however, as he is classified 1-A in the draft.

We sat next to Harry White recently at a life members' luncheon of our chapter of the Telephone Pioneers. Bill Farnham was not present but sent a note saying that he was in a hospital. He gave no details.

From the following article we learned that Bill Vermilye had been elected president of the Newcomen Society of England on November 12: ". . . Mr. Vermilye is the second American during over 20 years ever to be elected to the highest post in this British honorary society. Through the years, Mr. Vermilye has been closely identified with the American branch, serving as the society's American treasurer. The Newcomen Society of England centers its interest in material history, as contrasted with political history. It has as a collateral purpose to serve as another intimate link in the friendly relations existing between Great Britain and the United States. . . . The membership in this country is representative of the leadership in those branches of American business and professional and educational life which are touched by the society. . . ."

We report with regret the death of Samuel L. Wonson on September 30 in St. Louis, Mo. We are indebted to Langdon Pearse of Chicago for the following facts about him: Wonson was born in Gloucester, Mass., on July 1, 1877. He was graduated in Course I two years after receiving an A.B. from Harvard. His fraternity was Delta Upsilon. After serving for a year as an assistant in Civil Engineering at M.I.T., he was with the American Bridge Company for five years, as draftsman and assistant engineer. He was assistant bridge engineer with the Mexican Railway from 1907 to 1910, when he became general bridge inspector for the Missouri Pacific Railroad Company. At the time of his death he was

Have you made your reservation for Alumni Day, Saturday, February 26?

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assistant chief engineer of that railroad. He was a member of the American Society of Civil Engineers, the American Railway Engineering Association, and the St. Louis Engineers Club. — GUY C. PETERSON, Secretary, 788 Riverside Drive, New York 32, N.Y. THEODORE H. TAFT, Assistant Secretary, Room 3-266, M.I.T., Cambridge 39, Mass.

1903

We were sorry to receive only a brief notice of the death of Sidney Y. Ball, I, in Winnetka, Ill., on September 10. We hope to be able to supply more information later but have nothing further at this time. He came on to a class dinner nearly two years ago — his first visit to Boston in many years — and we had hoped to see him again.

The class record on the Alumni Fund is not too good, according to the report of H. B. Kane '24 on December 31. Of our quota of 99 contributors, 80 responded with \$1,469 against the quota of \$2,275; about 81 per cent of the quota contributed 65 per cent of the amount it seemed we should have. This is not quite so good a record as that of the two classes ahead of us but is somewhat better than the records of some of the other classes in the period from 1900 to 1905. George Greene, our Class Agent, would be glad to see increases both in the amount from present contributors and in new contributors. Several classes have exceeded either the quota of contributors or the quota of contribution.

Alumni Day is to be February 26, and we may possibly plan for an informal class dinner or luncheon at some time during that week. Due notice will be given of place and time. — FREDERIC A. EUSTIS, Secretary, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, Assistant Secretary, 441 Stuart Street, Boston 16, Mass.

1905

Here's a very modest announcement from the Grand Daddy of us all, Mitch Mackie, who writes: "I am somewhat like the proverbial cat on a tin roof, with seven or eight various jobs, including a 160-acre farm and, what may surprise you more, a trusteeship in a female college. In rereading the class notes which accompanied your dun, I saw many references to grandchildren, which to me do not seem very exciting, as I have 11 of them. All five of my children — three girls and two boys — have long since been married. One of the boys is a captain in the Army Air Forces and the other is making antiaircraft guns." If any member of the '05 Grandfather Club can beat this, he hasn't as yet reported.

Roy Lovejoy on his recent trip to his New Orleans factory dug up Bob Cutting, II, and got as far as dating him for lunch. Crossed wires prevented their meeting, but Roy learned that Bob is with the New Orleans District Flood Control and Rivers and Harbors. Bob has promised to come out of his shell and write us of his doings during the past 25 years. Roy attended the Tulane-Louisiana State football game as guest of Rufus C. Harris, President of Tulane, and in company with Wendell Willkie. Perhaps Roy is in the political game down South.

Joe Daniels sent a Christmas greeting to all and bragged about his vegetable garden

and his roses, which are still blooming "because we are only 1,000 miles north of California." Why not a plug for Seattle, Joe? Joe asks whether we have noticed that whereas we used to look for '05 noets near the back of The Review, we are now getting up near the head of the list. — Gib Tower, XIII, is now a naval architect for the United States Navy at Quincy, where he is supervisor of shipbuilding at Bethlehem Steel Company. His hours are 6:51 A.M. to 5:40 P.M. Apparently Gib builds our ships and Henry Keith pushes them in.

Bill Motter corrects our story as to Roy Allen but can't give us the "inside" except that Roy is in South America for the Defense Plant Corporation. Bill admits that he "last spring achieved the rank of sergeant in the Greenwich Mobile Battalion, a very good home guard organization." How'd you like to see Bill under a white tin hat? — Grove Marcy apologized for being behindhand in his correspondence, "breaking in a set of false teeth." We can't get the connection, but perhaps Grove is living from hand to mouth. — We ran into Carl Graesser at the National Chemical Show in New York early in December. He had no news except that he had seen Frank Payne last summer and that Frank had "really glorified the packing business." — FRED W. GOLDTHWAIT, Secretary, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, Assistant Secretary, 71 Newbury Street, Boston 16, Mass.

1907

Staff Sergeant George Pliny Allen, son of Charlie Allen, who has been missing in action since August 1, was awarded the Distinguished Flying Cross for "heroism of the rarest sort" on December 15, and the presentation was made to Charlie and his wife at their home in Spencer on December 17 by the commanding officer of Westover Field by direction of the President. The citation accompanying the award reads: "For distinguished and meritorious achievement while participating in operations against the Ploesti oil refineries of Rumania on the first of August, 1943. In the various duties he performed in this mass, low-level, and long-range attack on a strategically vital enemy target in one of the most heavily fortified zones of Europe, this enlisted man conspicuously distinguished himself. His capable performance of the assigned task, his gallantry under fire in a time of great peril, and his unfaltering determination to accomplish the mission in spite of many obstacles, constitute heroism of the rarest sort."

Charlie's son volunteered for service in the Army Air Forces shortly after Pearl Harbor, and for more than a year was stationed in England, where he saw almost continuous service. Then he was transferred to the Middle East. At the time of his transfer he sent his parents a medal he had received for completing a number of successful flights over enemy territory. As far as I know, this is the first son of one of our classmates to make the supreme sacrifice while in the armed forces during this war. On December 16, the day after the announcement of this award, Charlie's daughter, Penelope Allen Stebbins, wife of Lieutenant William F. Stebbins, United States Army, gave birth to a son, who was named Pliny Allen Stebbins.

Stuart Godfrey, of whom I wrote in the January Review, made magazine news on December 18 in the section of *Collier's* which is called "Wing Talk." I quote a small portion of the article: "... The big boss of the aviation engineers is Brigadier General Stuart C. Godfrey, a wiry little person who looks, acts, and talks just the way you'd like to think all our generals do. He describes himself simply as 'General Arnold's Engineer,' but he is likely to end up the most important engineer in modern history. His title is Air Engineer, Army Air Forces."

On January 1 Frank MacGregor became general manager of the electrochemicals department of E. I. du Pont de Nemours and Company. Frank had thought that he retired from active business life in 1939, but the coming of the war situation changed conditions with him, and he has been a long way from "retired," and apparently will keep reasonably busy for some time to come. Frank joined the Du Pont organization in 1916. He became successively assistant director of the development department, where he helped to lay the foundation for the company's expansion from the explosives into the diversified chemicals field; control manager of the former paint department in 1922; assistant director of the development department from 1923 to 1928, serving also as managing director of the Hotel Du Pont Company from 1926 to 1928. He was general manager of the Acele department of the former Du Pont Rayon Company from 1928 to 1934; was president and general manager of Ducilio S. A. Productora de Rayon, Du Pont affiliate in Buenos Aires, from 1934 to 1939; and served on special assignment from 1939 to 1941, becoming director of the company's priorities division in June of that year. Since February of 1942 he has been assistant general manager of the electrochemicals department. Every '07 man rejoices in the success that has come to Frank, the result of his own ability, although he speaks so lightly of it himself. He is a most loyal Technology and '07 man, and one of the most co-operative men of our Class in corresponding with the Secretary, although I may say that the facts given in this present write-up did not come from him but from a Du Pont news release.

Harold Wonson, in a letter dated December 7, said: "... My son Harold was married to Ethel Hamilton of Interlachen Park, Minn., a suburb of Minneapolis, the night before Thanksgiving, and his mother and I went out to attend the wedding. Incidentally, because of the shortage of young men, I acted as best man, which my wife assures me is approved by Emily Post. After the wedding festivities were over, we journeyed to Hutchinson, Kansas, where my son-in-law, Pete Lillard, is communications officer at the big Hutchinson Naval Reserve Aviation Base, and we visited for nearly a week with Pete, Marcia [Harold's daughter], and the two children. . . ."

The October issue of *Mining World*, a copy of which was kindly sent to me by Carl Trauerman, is of real interest to '07 men because it contains not only a condensed report of a paper given by him before the 1943 annual meeting of Montanans, Inc., but also a first-rate likeness of Clarence Howe, Canada's minister of munitions and supply, in connection with an

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article on the Canadian steel industry, in which Clarence is quoted. Carl sent me a carbon copy of a letter that he wrote to *Mining World*, one sentence of which reads as follows: "I am very much flattered to have my picture in the same edition with that of Clarence Howe, who was a classmate of mine at M.I.T. and manager of the class baseball team of which I was a member." How this takes us all back in memory to 1904 and 1905! — BRYANT NICHOLS, Secretary, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

For a year or so, your class officers have been considering seriously the feasibility or the practicability of our celebrating our 35th this June. There are some pros and several cons. After considerable deliberation, we have deemed it wise not to hold the reunion, the final word coming from Carl, as quoted below from his letter to Paul. We recognize the fact that five years are a long time to wait to see classmates and that the opportunity should not be passed up lightly. Charlie Locke '96, Alumni Secretary, urges that five-year reunions be held as usual. On the other hand, so many are engaged in important war work that it would be impossible for them to attend. Transportation difficulties and lack of gasoline would reduce still more the number who could be present. Moreover, it would be difficult to obtain much joy and satisfaction among just the few who would be there, while all the time we realized that the world around us was reeking with strife and sadness and that we should have remained on the job doing our part. As an alternative, it is suggested that an unusual effort be made to come to the banquet on Alumni Day, which this year will be held on Saturday, February 26, at the Statler in Boston. We hope that the foregoing decision will meet with the general approval of the Class.

We quote from a letter from Carl, who is still domiciled at Strasburg, Lancaster County, Pa.: "... I believe it is highly desirable to by-pass a big class reunion in 1944, because there are many fellows who undoubtedly could not get to it, such as, for instance, Mollie Scharff. Why have a reunion when we know in advance that many of the fellows will be unable to attend? I have had occasion to visit Washington several times, and on two of them Mollie and I were able to get together for luncheon. Mollie says that there are so many things to be done and that ordinary office hours are so insufficient, he spends regularly from about 8:30 in the morning until after 7:00 at night on the job.

"Carl, Jr., is engaged in diving work with the salvage department of the Navy and helped in the raising of the *Normandie*. He appears thrilled with his work, which is extremely interesting, but he says that diving operations, anyway you look at them, are a tough job. He gets his diversion in ice skating, and fortunately he can get to the New York Skating Club, of which he is a member. ..."

The following letter recently received by the Secretary from Bob Doane not only tells us about Bob and "that lad of mine" but also gives us some close-ups of the war

effort in Washington: "I am spending my time in Washington in the Navy Department, lending a hand on the shipbuilding program. The ships have been built and are continuing to be built, as you so well know, but the accomplishment is the result of private initiative. And what a magnificent job it has been! It is with regret that I can hardly say that the part of the government bureaus, here in Washington, has won my respect.

"You will be interested in the progress of that lad of mine, Duncan, to whom you showed such great kindness. I cannot tell you exactly where he is, for I do not know. But it is somewhere east of Gibraltar and probably in Italy. I believe that he is still handling detection instruments for the Army. . . . He refused to go to officers' school, preferring to stay in the rank he had, that of technical sergeant, where probably he can do his best work. [Duncan was also responsible for the destruction of a Jap submarine.]

"As for my own life here — I am alone, have a comfortable room, work hard with partial success, and am still being paid by my company, the Anaconda Wire and Cable Company. If it were not for a certain loyalty to my company, I am not sure that I should like to remain in my present work. I don't like to have my name associated with inefficiency. . . . I try to keep in touch with the Technology organization here and do occasionally attend their dinners, which are sources of great pleasure. There are many fine Technology men here. . . ."

In the fall the Review Secretary was confronted with the necessity of procuring extra laboratory instructors to take care of a large Army contingent that arrived for war training. We were running the electrical engineering laboratories from 8:00 A.M. to 10:30 P.M., and extra help was imperative. It was very fortunate that Matt Durgin, VI, came to mind and he rendered valuable assistance, particularly on Saturdays. Almost since he left the Institute, Matt has been teaching science at the Charlestown High School and has lived on Mount Auburn Street, Cambridge. He is married, has no children, and asserts that his is an uneventful life.

News has come of the death on December 7, at the Roosevelt Hospital, New York, of H. Moore Richards, who was 59 years old. He was graduated from Yale in 1905 and did postgraduate work both at Harvard and at M.I.T. He operated his own insurance agency until two years ago when ill-health forced him to retire. He lived at Jackson Heights, Queens. His wife, Mrs. Rosa Coates Richards, survives. — PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1911

Another junior elevenner, Nancy van Tassel of Newtonville, was married recently. But let her proud dad, Edward D. van Tassel, Jr., major, Chemical Warfare Service, tell the news, as he did in a letter from Huntsville Arsenal, Ala., just before Christmas: "Nancy was married on De-

cember 18 to Air Cadet Russell Harmon, Jr., at Helena, Ark., where he is stationed. Helen and Nancy came to Huntsville by train and we drove over for the wedding, after which Helen and I returned here. We have taken a bungalow and will resume housekeeping for as long as I remain assigned to duty here."

My annual thanks to the many classmates who favored me with greetings at yuletide. The cards seemed lovelier than ever this year. Art Coupal, II, added this cryptic message on the card sent by the Coupals from 30 Norwich Road, Needham: "Just finished my purling and knitting. Now look for a SOCK?" M-m-m.

In early December at a luncheon of the Boston chapter of Hadassah attended by 1,600 women at the Hotel Statler, Boston, Albert O. Wilson, I, Boston's royal consul of Sweden, was guest of honor along with the Danish vice-consul at Boston. The two honor guests were presented with scrolls saying that two groves of 75 trees each are to be planted in Palestine in the name of King Gustavus of Sweden and King Christian of Denmark as a tribute to Sweden for opening its doors to Jews fleeing Nazi oppression and to Denmark for its part in defying the Nazis and shielding its Jewish countrymen, rather than persecuting them.

Tom Haines, II, along with Jack Herlihy, a Boston Edison old-timer, has recovered splendidly from a gallstone operation and is back on the job again.

In mid-December, I was in Woonsocket, R.I., on a business trip and bumped into Burleigh Cheney, II, President of Skyways, Inc., with offices in the Hospital Trust Building, Providence. Burleigh was about to be guest speaker at a joint luncheon meeting of the Lions and Kiwanis clubs and the Chamber of Commerce. In his talk he revealed plans for postwar helicopter "taxicab-by-air" travel for Rhode Island and Massachusetts cities and towns, for which his firm has already mapped out 17 flight routes and 158 timetables. Only short hauls will be made, he said, with seven-passenger helicopters planned to average about 80 miles an hour at a "taxi fare" of 10 cents a mile. Movies depicting the performance of the helicopter were shown, during which Burleigh told his audience that helicopters — the airplanes that can land "on a dime" and travel straight up in the air, descending as slowly as a foot a minute — were first developed by Igor Sikorsky and that many manufacturers are making the craft for the United States Army. Skyways, Inc., he said, is a Rhode Island corporation, not associated with any national firm or manufacturer.

Please don't blame your Secretary entirely for the brevity of this edition of class notes. Remember, lots of you guys owe me a letter, and it's not too late NOW to make good on that New Year's resolution I hope you made to "write to Dennie." — ORVILLE B. DENISON, Secretary, 82 Elm Street, Worcester 2, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford 55, Mass.

1912

Jim Cook, our Class Agent, reports that contributions are still coming in, which will help our percentage. It does seem as though we should be able to match, if not exceed, our neighboring classes in both

Have you made your reservation for Alumni Day, Saturday, February 26?

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number of subscribers and total amount subscribed. Even though the amount is small, please remember Jim and the Institute on the next appeal.

Your Secretary received a very interesting "voice-written" letter from A. P. Hornor, who is vice-president of Thomas A. Edison, Inc., Ediphone division, at West Orange, N.J. A. P. says he will be on hand for the next reunion — date at present uncertain. — Joe Champagne and his attractive wife have been appearing at the Copley Plaza ballroom each evening in a dance number. We old men certainly envy anyone as active and light on his feet as Joe. — Clarence McDonough has moved from Cleveland to New York, where he is now with the Foundation Company at 120 Liberty Street.

Johnnie Noyes came on from Dallas for the annual meeting of the American Society of Mechanical Engineers in New York and spent a day in Boston. I was lucky enough to catch him for lunch and check up on the whereabouts of his active family. His eldest daughter, Mrs. Worden Waring, is living in Berkeley, Calif.; his eldest boy is with the Army Air Forces somewhere in the South Pacific; his second boy is employed by R.C.A. on electronic development; his third boy is in the Army at Camp Walters; his next girl is in college; and his youngest girl is in junior high school. When I met him in Harvard Square, Johnnie was easily recognized by his light-colored ten-gallon hat, which pleasantly reminded everyone of the warmer climate from which he hails. — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown 72, Mass.

1913

Colonel E. C. Gere, I, is commanding officer at the Savannah Army Service Forces Depot. Ed is rightfully proud of the award of a Treasury "T" flag for 100 per cent participation and nearly 11 per cent of pay-roll deductions for war bonds on the part of the depot personnel. — Joe Strachan, I, writes: "If this war emergency rate of activity ever slackens, I hope to be a better correspondent of yours. Meanwhile, just think of Carnegie-Illinois Steel Corporation as it is — the producer of over one-fourth of the United States steel industry's output — and then you'll perhaps be able to visualize something of my own activities, which still are those of 'assistant to the President.' I saw Bill Brewster and Jack Coe, among others, at a recent meeting of the National Association of Manufacturers." — Dana Gillingham, V, had a bout with bronchopneumonia, and happily won it.

Read what Effie Louisa Macdonald Norton, V, does in part: "... I have four New Hampshire hospitals to cover as pathologist — Wolfeboro, Rochester, Exeter, and Portsmouth — and so I do a lot of driving regardless of the weather. ... In addition to my regular hospital duties, I have been connected with three civilian-defense blood banks and have done a great deal of talking in connection with health work in the state. ... Last June, I went to Chicago to take the examinations given by the National Board of Pathology, and now I hold their certificate. My daughters have both completed high school; one is doing research work in a laboratory, and the other is going to college the next term and will, I

think, go in for some form of science, probably chemistry."

Percy Whitman, III, writes from Los Angeles: "... I have had the great pleasure of having my son start out at M.I.T. He had one term before the draft got him. His eyes left him out of the Air Forces; so he decided to let nature take its course. ... Things have gone very well with me. ..."

Earle R. Lincoln, X, is located at the northern end of Vancouver Island. Edgar Menderson, II, is executive secretary of the Security Savings and Loan Company, Cincinnati. Daniel Ricker, IV, is technical engineer with the Boston Edison Company and also co-ordinating engineer for the Utility Wartime Aid Program, First Service Command and First Naval District. Paul Cogan, II, is an acting division head in the ordnance department of the Bethlehem Steel Company.

Here are 15 nice replies to a request for news. From Arthur W. Carpenter, X, of Akron: "... I am back home at Goodrich after having spent nine months in Washington with the conservation division of the War Production Board. ... Everyone in the rubber game is so pressed by the many problems incident to the conversion to synthetic while pushing at the same time for more production of war goods that one has little opportunity for correspondence and keeping in touch with other activities."

From F. D. Rich, X, of New York: "... I am now advertising manager and in charge of production for the industrial publication, *Marine News*, and for the annual 'Marine News Directory.' These are two quite important publications of the shipbuilding and ship operating industries. Of course, like everyone else in the industrial field these days, we have been forced to crowd about 36 hours of work into an ordinary working day. ... One principal drawback is that it keeps me tied down to the office so that I am deprived of the opportunity of personally meeting some of my old friends from time to time. ..."

From Bill Mattson, I, of Boston: "No hits, no runs, and not too many errors — I hope. The American Locker Company, whose parcel-checking lockers are now used by millions of travelers, is going strong despite the lack of new equipment. I happen to be one of the vice-presidents of the company and also have many 'extra-curricular' activities as usual, such as being chief village air raid warden of Newtonville and serving on the Newton board of public welfare and the city Republican committee (what's left of it). My daughter Janet, Mount Holyoke 1942, is now learning how to invest money (of which I have but little) with the investment department of the United Business Service."

From Bob Bonney, X, of Kearny, N.J.: "I am assistant manufacturing manager for Congoleum-Nairn, Inc., busy turning out bombs, shells, grenades, fuses, treated fabrics, and so on. Due to age, dignity, and long white whiskers, I'm also on the executive committee of the M.I.T. Club of Northern New Jersey." — From Fay B. Williams, II, of Providence: "... I put in about 90 per cent of my time showing manufacturers how to protect their plants against loss by fire and so on, and, incidentally, how to lower their insurance cost. Rather a humdrum existence com-

pared with what many of the fellows are doing."

From Sam Knight, VI, of Hayden, Ariz.: "... I have been operating the old Christmas Mine under lease for about four years. I had a letter from V. V. Ballard last February. He is in the orchard development business in California, at Rancho Santa Fe. V. V. remarked that he supposed I was getting rich in the copper business during the war. Perhaps he hasn't heard about the man-power situation." — From Bob Portal, VI: "I am still a first lieutenant in the military police, stationed at West Springfield, Mass. ..."

From Jack Horsch, XIV: "... I'm still at the research laboratory of the Socony-Vacuum Oil Company at Paulsboro, N.J., where I've been since 1927. In my spare time from my present six-day week I do the customary things, such as act as air warden when the siren sounds, attend technical meetings, dabble a little in senior Scouting, or occupy myself with the care of our house, which we acquired about five years ago."

From J. B. Woodward, Jr., II: "I am now in my 30th year with Newport News Shipbuilding and Dry Dock Company. I can hardly believe it myself! A happy and worth-while experience. My part in helping to maintain the company's fine record in building landing craft, cruisers, carriers, and supercarriers has left time for little else during the war years." — From Ralph Thomas, VI, of Baltimore: "... Of course I often see Clarence J. Berry, who was recently promoted to the position of illuminating engineer, in charge of the lighting service department of our company — Consolidated Gas Electric Light and Power Company of Baltimore."

From Jack Farwell, II: "... I am still with Sperry Products, Inc. [Jack was too modest to say that he is president], at Hoboken, N.J. ... About a couple of months ago, I was at M.I.T. long enough to hear some of the latest class news from Arthur Townsend." — From Bill DeYoung Kay, VI, of New Orleans: "... I am now treasurer of the Lane Cotton Mills Company, after having been a member of the New York Stock Exchange for some 15 years (in fact I still am a member). Life in the South is very pleasant after having been a Yankee for so long." — From Harold Rand, I, of Roslindale, Mass.: "I was married for the second time in January, 1943. I am still in the retail grocery business, which is a tough racket nowadays. A farm in the country with a few cows, chickens, and pigs — together with a jeep — would look good to me now."

From S. W. Selfridge, II, of San Francisco: "... I am just another mechanical engineer gone wrong. After a varied existence following graduation (two years of Army Ordnance in World War I, attached to the 302d Mobile Ordnance Repair Shop, 77th Division), I finally settled on a crude oil career, joining up with Standard of California in January, 1922, on fire-protection work. This type of work lasted a year and a half. I was then transferred to the right-of-way end of the business in Los Angeles. This is a far cry from mechanical but intensely interesting. I have stuck to it since. January, 1937, found me back in my old home town as manager of Standard's right-of-way department, and here I am. Though I am itching to get back in uniform, I am

1913 Continued

afraid I'll have to sit on the side lines. We really have a job to do in my work. My boy Bud (S.W.S., Jr.) is a first classman at Annapolis, Class of 1945, due to be graduated next June. I hope to get east for the graduation. My daughter, 18, is ready for college but will turn to and work for a spell. I have been back to M.I.T. once since graduation — in 1929, en route abroad. . . ."

Finally, we have this note from Lindsey Whitehead, I, of State College, Pa.: ". . . I am still teaching but under conditions quite different from normal. Our usual student body has been replaced by students from the Army (basic and advanced), the Air Forces, the Marines, and so on. We also have a group of Curtiss-Wright girls, Hamilton Standard Propellers employees, and others. I have been particularly interested in aerial navigation and aerial mapping. Our boy has been in the service for two years. Three of our girls are married, and the grandchildren are starting to school. Gosh, we're getting old." — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 784, Pawtucket, R.I.

1914

On December 8 Charlie Fiske arranged for a small dinner in New York to discuss reunion plans. Present, in addition to Charlie and your Secretary, were Jim Reber, Walt Keith, and Paul Owen. Buck Dorrance and Ross Dickson had planned to attend but unexpectedly were not able to do so. It was agreed that we would try to arrange a reunion in June at some accessible place on the railroad between New York and Boston. Such a location would make it unnecessary to have advance Pullman reservations out of either Boston or New York. It was further agreed that because of war conditions, no attempt would be made to run the usual publicity campaign. As soon as the dates and place are known, a bulletin will be mailed out to the Class, and later final details will be sent. The reunion will probably be a Saturday and Sunday affair.

Jim Reber and Gardner Derry attended the meetings of the National Association of Manufacturers in New York. Buck Dorrance was also there but not at the same time as your Secretary. Norman MacLeod, who is a director, usually is in attendance, but the Secretary did not happen to see him.

Now that Charlie Fiske is sporting a grandson, he suggests that a special feature be made of grandfathers at the reunion. He avows that when it comes to playing golf, the grandfathers can take the youngsters on any time. Let us see! Just after the grandson was born, Charlie's daughter went with her naval lieutenant husband to Terminal Island, Los Angeles. Housing and transportation being what they are in war areas, Charles had the pleasure of learning again how to take care of a few weeks' old baby.

Buck Dorrance was in Boston recently to see his son, who has just been transferred from the Midwest to the officer candidate school at Harvard. Walt Keith's son, Walter, Jr., '41, X, is now a lieutenant in the Ordnance Department of the Army and is stationed at Hope, Ark. — Jim Reber's son is a corporal in Chemical Warfare and is stationed at Jefferson Barracks, Mo. — One of Paul Owen's three daughters is serving in Washington with the British Army staff. Paul also is a grandfather.

Twice recently your Secretary has seen Bert Hadley — first in that wondrous building in Washington, the Pentagon, and later in New York. Bert has had a tremendous task and has performed it with great distinction. The percentage expansion of the Remington Arms Company has been one of the greatest in the country, and Bert has had a very prominent part in this expansion. — Crocker still continues to appear in the press in connection with his work on synthetic spices. A recent photograph by World Wide showed him inhaling from several beakers. The caption said that he was checking aromas of cinnamon, nutmeg, and white pepper. With the shortage of certain beverages, perhaps we shall be calling on him to expand his activities in the synthetic field. — Frank Ahern has just published a most interesting paper on fires in Federal buildings for the fiscal years 1942 and 1943. This publication contains some pertinent data on the serious hazards involved when adequate care is not taken in the construction of temporary buildings. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

1915

A generous check received welcomingly at Christmas boosted our total to \$2,961.50 (100 per cent of quota) from 149 men (85 per cent of quota) — an average of \$19.90 per man. This sets a new all-time high for us in all departments. My thanks to all you classmates. By putting the 1943-1944 Alumni Fund over the top for our Class, you have proved again that you are truly loyal and generous Technology men.

At Eliot Union Church, Lowell, on December 18, Miriam Louise Runels, daughter of Chester and Margaret Runels, became the bride of Peter deMallie, an ensign. A reception was held at the home of the bride's parents. — In the First Church in Boston during Christmas week, Doris Sawyer, daughter of Mr. and Mrs. Howard M. Sawyer of Andover, became the bride of Franklin R. Hoar, United States Army. A reception followed at the Chilton Club.

Recently I met Carl Wood wandering through the Institute buildings. He's hardly changed a bit. Must have been something in Course I that keeps those chaps in such good condition at our age. — R. G. Knowlton resigned on December 31 as vice-president in charge of production for Bigelow-Sanford Carpet Company, Inc. Has anybody seen or heard anything of him? — Louie Young was recently elected a vice-president of Gillette Safety Razor Company of Boston. Serving Gillette as a consulting physicist since 1927 and joining the organization as works manager in 1937, he continues to act as plant superintendent in his new capacity as vice-president.

Fred J. Vogel has been appointed professor of electrical engineering at Illinois Institute of Technology. He had been associated with Westinghouse Electric and Manufacturing Company for 24 years as consulting transformer engineer. He designed a new type of naval ordnance which has been adopted by the Navy for use in World War II. His pioneering accomplishments include the design and installation of the first single-unit million-volt testing

transformer, the first successful installation of cascade-connected transformers in the United States, the first surge testing apparatus for transformers, and the first oil-circulation force-cooled transformers. . . . During World War I, Vogel was employed on submarine construction with the Navy. He will carry on research in the electrical engineering department at Illinois Tech.

Little Andy, the man who wasn't there at our 25th reunion (remember his present?), writes: ". . . We are living in Providence and I am keeping busy on my job. It will be wonderful when we get on a construction job again, as this shipbuilding nonsense does not appeal too much to me, but it must be done. I wrote to Pirate Rooney and I hope he will answer me, now that he has been freed from Washington." — On her Christmas card, Mrs. Lena M. Tobey wrote: "Evidently you are not aware that Jim is a lieutenant colonel and has been abroad since May. He went to the School of Military Government at the University of Virginia and is with the Allied Military Government in Sicily and Italy at present." — All the best to Jim and our other boys in the service!

To the many classmates and their families who remembered me so thoughtfully and kindly with Christmas cards go my deep warm feelings for the years of our fine old friendships. — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1916

Joe Meigs has recently been admitted to membership in the firm of Blair, Curtis and Hayward, counselors at law, 60 East 42d Street, New York City. Joe is continuing in his former specialized line — patent and trade-mark work.

Joe writes: "I had a most interesting talk with Rudolf Gruber, who, as perhaps you know, is vice-president of Merck and Company, in charge of new products. He has played a prominent part in making available to the public a number of medicinal or pharmaceutical products of the greatest importance. One of these is vitamin B₁. The preparation of vitamin B₁ from its naturally occurring sources is an extremely expensive procedure. . . . The successful synthesis of the product has changed the picture. It is, however, one thing to synthesize a complicated molecular structure like vitamin B₁ in the laboratory, and it is another thing to translate that scientific and laboratory accomplishment into successful industrial application. . . . I think it is of the greatest interest to every member of the Class to learn that one of our members has played so prominent a role in such an important project. Rudolf tells me that at present he is busier than ever and is now working on penicillin." — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston 9, Mass.

1917

The majority of our special correspondents have done us dirt, and as a result the news is rather meager. But it is an ill wind which blows no one good, and with the current paper shortage the editors will probably be just as happy.

Have you made your reservation for Alumni Day, Saturday, February 26?

1917 Continued

Walt Beadle and Dutch du Pont are doing some postwar planning for reunions and suggest that, instead of having the reunion program impromptu, something of general interest to the Class be featured. We suggest that all of those who did not attend the 25th arrange a session with Horace Ford in the Tech dinghies. I can assure them that they will get their money's worth. Those who were at the 25th will adjourn to the bar for those few hours. [Frederick Bernard prepared this month's notes. — Ed.]

Dick Loengard and his United Chromium, Inc., are continuing to make a very definite contribution to the war effort. Dick writes that he cannot go into detail but that the results of their work are going to be noticeable after the war. — Clair Turner's latest job is that of consultant in health education for O.I.A.A. Bet you didn't know that these letters mean Office of the Coordinator of Inter-American Affairs.

Potts Mehaffey is now a full-fledged commander in the Navy. He yearns for the salt spray in his face but must content himself playing with toy boats at the David W. Taylor Model Basin near Washington. Seriously, the work done at this model basin is very important, and we learn from other sources that Potts is doing a good job. He has two boys in the Army and is a grandfather of two years' standing. — Ras Senter writes that his headquarters are still in Texas but that due to manpower shortage he has temporarily had to stop being an executive and is out in the field in Louisiana, getting his hands dirty trying to separate oil from sand and salt water. It sounds like a tough job. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1919

The 1944 Class Day exercises will be held on Saturday, February 26. Your Secretary has been selected to give the 25-year talk at 2:00 P.M. at the New England Mutual Life Insurance Company auditorium, corner of Boylston and Clarendon streets (the site of the old Technology buildings). Classmates are urged to attend if they can conveniently arrange to do so. The Alumni Dinner is to be held in the evening. Since the Class of 1944 is our 25-year class, our attendance at this dinner should be indicative of this relationship. So let's hope everybody will be out. Our 25-year reunion plans are being formulated, and it now looks as though we shall convene on July 28, 29, and 30 somewhere in Connecticut. Announcements will be sent out very shortly. The Alumni Secretary indicates that those who had their five-year reunions last year were well pleased that they did not postpone them, and he feels that it is worth while for classes to make special efforts to get together in these war times.

Charles A. Chayne, chief engineer of the Buick division of General Motors, discussed the potential utilization of high-octane fuels in engine developments at a meeting of the Society of Automotive Engineers on December 2 at the Hotel Pennsylvania. Four other 1919 men attended this meeting: Bernard S. Coleman, Fred Given, Herbert Best, and Gene Smoley.

The S.A.E. paper, *Accelerator*, carried a news item about Chayne as follows: "Charles A. Chayne is recognized as an outstandingly progressive automotive engineer and specialist on engine design. A native of Harrisburg, Pa., he had his early education in the Harrisburg schools. . . . Mr. Chayne's first assignment was with the National Advisory Committee for Aeronautics, at Langley Field, Virginia. With the cessation of war activity, he returned to M.I.T. and for a period was instructor in Strength of Materials and in Automotive Engineering. The call of industry was too strong, and in 1926 he left to become a research engineer with the Lycoming Manufacturing Co. Just a year later found him with Marmon Motor Car Company as power plant designer and experimental engineer. In 1930 he joined the Buick Motor Division of General Motors, being in charge of their Engine Division. His obvious ability and his achievements in Buick rapidly qualified him for increasing responsibility and in April 1936, he became chief engineer."

Buzz de Lima returned to the States from overseas Navy operations for a short visit, which he spent with his wife in Washington. He writes: "I was indeed fortunate to be able to return, if only for a short time. I find myself thrilled. Lighted streets, milk, orange juice, ice cream, napkins, oysters, white bread, sugar, cream, shell eggs, wrapping paper and brown-paper bags, hefty newspapers — all the thousand impossibles which I had come not to miss because I had learned not to expect them — make the war and my assignment seem very remote indeed. Rest assured I'm enjoying them — and the company of my gorgeous wife — to the full before returning overseas. It's nice to think that the next time I return it'll all be over and we can stretch our legs out in front of the old hearth and drink our nogs with confidence that there's a real peace on earth. You guys here at home will have built the machines that made it possible. And the fellows overseas know it! . . ."

His letter included his contribution to the 25-year gift to the Institute.

E. R. Hubbard of 735 Elm Avenue, Teaneck, N.J., says: "My company, the George S. May Company of New York City, is up to its ears in war work, and I'm at about the same level in my position as director of engineering training. We are always in the market for engineers, especially now. Hence if you have any, send them over to see us."

Dean K. Webster, Box 989, Lawrence, Mass., has seen Clarence Nutting. He wrote to Ralph Silloway at 368 High Street, Newburyport, Mass., but the letter came back. If anyone in the Class can send in Silloway's new address, it would be appreciated. — Leslie A. Jackson, 1600 Gaines Street, Little Rock, Ark., is still in the water supply business. — Bernard S. Coleman spoke over Station WNYC on December 13 on "Tuberculosis and You." — In the October issue of *Bell Laboratories Record* appeared an article by Frederick J. Given, "Mica for War Purposes." — Francis D. Porcher has moved from Morganton, N.C., to 4023 University Way, Seattle, Wash. — Maurice E. Goodridge finds that working a six-day week and two evenings fills his schedule pretty much.

Lloyd R. Sorenson, who is vice-president and general manager of the James River Ship Company, 329 63d Street, Newport News, Va., and cost engineer of the Newport News Shipbuilding and Dry Dock Company, expects to attend our class reunion this summer. He plans to bring his three children to Boston with him to visit their aunt. Lloyd has traveled extensively in the United States in connection with the shipbuilding program. He is active as a director of the Newport News Building and Loan Association and as a member of the James River Country Club and of the Kiwanis Club of Newport News.

Chuck Drew writes from 200 Hawthorne Road, Interlachen Park, Hopkins, Minn., with regard to the 25-year reunion: "You are doing a fine job in collecting the information on the Class, and I am enjoying it a lot as it appears monthly. . . . Chuck is now director of industrial relations for the Minneapolis-Honeywell Regulator Company and was for over 10 years honorary secretary of M.I.T. in Minneapolis. He is director of the Minneapolis Y.M.C.A., senior warden of St. Paul's Episcopal Church, and director and secretary of the Cleary Hills Mines Company, Fairbanks, Alaska (gold and tungsten)."

Paul F. Swasey got together with Fred Hewes in Norfolk, Va., to work on the reunion. Paul says: "Gene, you sure have my sympathy in raising a good class gift in these times. . . ." — Mrs. Louise Peirce Horwood, 37 Westbourne Road, Newton Center 59, Mass., sent in her reunion material. — H. H. McClintic, Jr., a lieutenant commander, wrote in from 1728 Union Commerce Building, Cleveland 14, Ohio, in regard to our reunion gift to the Institute. — Henry B. Blumberg sent in his reunion material. His address is care of Highland Sportswear, Inc., 520 Eighth Avenue, New York City. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y.

1920

Sidney Dudley has been promoted from commander to captain in the Navy and is at present at the Portsmouth Navy Yard. Robert Hayler has likewise been promoted to a captaincy in the Navy. Charles Lawson has been promoted to lieutenant colonel and is with the matériel command at Wright Field. Lincoln Chambers is a colonel with the Army Map Service in Washington. Raymond Collier, an Army captain, is connected with the Air Force Intelligence School, Harrisburg. Aaron Bradshaw is now a brigadier general and when last heard from was in England. Harry Kahn is a captain, stationed at the Port of Embarkation, Brooklyn, N.Y. Frank Owen of New Bedford, Mass., has been promoted to major. Bob Rowe is a lieutenant commander and his present address is 1610 New Hampshire Avenue, N. W., Washington.

Captain Edward Ellsberg continues to add to his famous reputation as a salvage expert, his specialty being the unblocking of harbors which the enemy has supposedly put out of commission. — L. B. Hitchcock has recently been promoted to the position of manager of sales development for the Hooker Electrochemical Company in Niagara Falls. — Hank Caldwell is New York district manager of the Whiting Corporation, 136 Liberty Street, New York City.

1920 Continued

I came across him at the Chemical Show in December, and he appeared to be in first-class shape.

John Philbrick is with the Giant Portland Cement Company, Philadelphia. Ray Perry is with the Western Cartridge Company, East Alton, Ill. John Nalle is in Lancaster, Pa. Ted Kendrick is in Bristol, Tenn. Jim Downey is back in White Plains, N.Y., at 20 North Broadway. L. D. Wilson is now in New York City, at 50 Church Street. Benjamin West is in St. Petersburg, Fla., at 3401 Tealman Avenue. Alfred Peterson is in Arlington, Va. Frank Maconi is living at 77 Chester Road, Belmont. Simon Freed is at Columbia University. Chick Dana's address is 56 East 87th Street, New York City. Mrs. Mildred L. Coombs is at Tower Hill, Sanbornton, N.H.

I was pleased to receive another highly original and artistic Christmas greeting from K. B. White, who still continues to be the lord of Los Vinyard, 1300 Manhattan Avenue, Union City, N.J. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

Harold O. Bixby, a colonel in the Signal Corps, returned to this country last May. He spent the summer in California and later came east. His daughter is in the WAC and his son is about to enter West Point. — Asher Z. Cohen, X, a lieutenant colonel in the Ordnance Department, has been commanding officer of the Delaware Ordnance Depot, Pedricktown, N.J., for the past 16 months. He reports hearing from Jack Crowley, II, who is a captain of Ordnance.

S. Murray Jones, VI, is with the Office of Scientific Research and Development, Chanin Building, New York City. — David O. Woodbury, VI-A, has moved to 9 Fieldcourt, Bronxville 8, N.Y. He is the conductor of the column, "Your Life Tomorrow," in *Collier's* and has completed a biography of Elihu Thomson, which is being published by Whittlesey House, New York. — The home address of Walter C. Hagerton, VI, is now 3313 Sixteenth Street, Northwest, Washington, D.C. — As one of the 25 original United Aircraft employees who had a part in the building of the first Pratt and Whitney Wasp engine, Lawrence Castonguay, II, had his photograph recently in newspapers throughout the country.

That extra day this month can be put to no better use than writing a note to your Assistant Secretary for these pages. Those of you who have recently rejoined our ranks are especially invited to get the habit of writing early and often. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 1000 Passaic Avenue, East Newark, N.J.

1923

I regret to report that Henry M. Mullinnix, rear admiral, Bureau of Personnel, Navy Department, was killed in action on November 24.

Edward George Bernard announces the marriage of his daughter Dorothy to Leo Sarsfield Hayes, on November 1 at Scituate, Mass. Mr. and Mrs. Hayes are at home at 7 Melrose Street, Boston.

Our Vice-president, Doc Smith (Reliance Electric and Engineering Company,

Cleveland), informed me that Sydney G. Walton, Secretary and general passenger manager of the Matson Navigation Company, San Francisco, was recently appointed vice-president of the company. Doc also sent a clipping of an article by James A. Pennypacker in the magazine *Skating*, describing the building of an 18-foot by 24-foot practice rink in his back yard at Quincy, Mass. From this source we learn that you cannot obtain smooth ice by turning on a stream of water and letting it run until the rink is flooded, because the current prevents the water from freezing and forms a channel, or gully, through the ice. Instead, you're supposed to put the water on in a fairly fine spray. Warm water does a better job than cold water, it seems — freezes slower and produces ice more stress-relieved, less likely to chip.

This technical information is given for what it may be worth. If it doesn't work in your back yard, don't blame me. Anyway, Pete's three children, ages four, six, and eight, together with their small neighbors and occasional members of the Quincy Figure Skating Club, get a lot of fun out of the rink.

But the important news about Pete is that he has been elected a council member of the Society of Naval Architects and Marine Engineers, one of the youngest men ever to be so honored. Pete was also named chairman of the New England Association of Naval Architects and Marine Engineers.

Another naval architect, W. F. McNary, has been promoted to chief engineer of the George Lawley and Son Corporation, Neponset, Mass. After graduation his career included three years with Cox and Stevens, New York City, and 15 years with John G. Alden, Boston. Two years ago he joined the Lawley yard. His home is in Attleboro, and he is active in the Society of American Shipbuilders and Designers. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree 84, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

1926

From Major Elton Staples of the department of submarine mining, Coast Artillery School, Fort Monroe, Va., comes a pleasant note and clipping about one of our eminent colleagues, Mark Greer. Mark has been appointed vice-president in charge of engineering of the Edwin L. Wiegand Company. Prior to his promotion he had been manager of industrial sales. Elton, I assume, continues to practice pedagogy in behalf of the Army in his present assignment.

Another promotion of note is that of Earl C. McMahon from engineer to chief engineer of the Perth Amboy station of the Public Service Electric and Gas Company of New Jersey. — H. C. Gunning has resumed his duties in the department of geology, University of British Columbia, after spending the past summer in geological investigations.

A handsome notice just received conveys the intelligence that John Hoxie '25 and George E. Faithfull announce the formation of the firm of Hoxie and Faithfull for the practice of law, specializing in trade regulation and patents. The new firm, which has our hearty blessing, has hung out a shingle at 233 Broadway, New York City. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

Because of the urgency of his duties with the Boots Aircraft Nut Corporation, Ray Hibbert, who has loyally served as class secretary for the past 15 years, has with regret submitted his resignation to President Jim Lyles. The undersigned has been appointed in his place and, needless to say, will greatly appreciate hearing from all members of the Class who can find time to give the rest of us news of their latest whereabouts and activities.

No better way of starting the new series of class notes could be found than to quote from a press release received from General Headquarters — Southwest Pacific area, in which the exploits of Sam Auchincloss are described as follows: "Somewhere in Australia: . . . Colonel Samuel S. Auchincloss is in charge of all planning for the Signal section of General MacArthur's staff. Prior to this assignment he was awarded the Silver Star for gallantry in action near Buna in New Guinea, on December 29, 1942, when as Signal officer for Lieutenant General Robert L. Eichelberger, he succeeded in keeping communication lines open to the front, though under enemy machine gun and rifle fire. He joined General MacArthur's staff in April as operations officer of the Signal section, and plans all wire, radio, and telephone communication and aircraft warning systems in the Southwest Pacific. Following graduation he was with the New York Telephone Company and was vice-president of the Eastern Aeronautical Corporation before joining the New York Quotation Company, 11 Wall Street. He resigned his position as vice-president there in September, 1940, to enter the Army as Signal officer of the 44th division at Fort Dix, N.J. Later he became Signal officer for the northwestern sector, western defense command, at Fort Lewis, Wash., before coming to the Southwest Pacific area in April, 1942. His home is in Darien, Conn., but his wife and two children live in West Orange, N.J."

Albert H. Burton, an Army colonel, who was instrumental in designing and perfecting the landing barges used by American troops in the invasion of North Africa, is now district engineer of the Philadelphia office of the United States Army District Engineers. He was formerly chief of the fortifications center in the Office of the Chief of Engineers in Washington. — Russ Westerhoff, who was previously heard from as resident engineer on the construction of natural gas compressor stations for the Southern Gas Line, Inc., at Monroe, La., showed up a few months ago as assistant project manager for Ford, Bacon and Davis on butadiene and styrene installations at Charleston, W. Va. — The superintendent of the Division of Aeronautical Photographic Science in Washington, D.C., is none other than Elmer Andrews, an Army major. — Jim Lyles is receiving congratulations on his appointment as a director of the Bronxville Trust Company.

Curtiss-Wright at St. Louis, Mo., continues to keep Charles Hurkamp very busy. He is now in charge of new aircraft design. In the same town is Frank Mesker, who still heads up the Mesker Brothers Iron Company, which is making numerous military devices. — After spending 17 years with General Electric at Schenectady, Edward

Have you made your reservation for Alumni Day, Saturday, February 26?

1927 Continued

O. F. Jones recently joined the Cook Electric Company and will be in charge of Cook's eastern division office at Greenwich, Conn. — The Sales Executive Club of New York was recently addressed by Lee McCanne, who is now assistant general manager of the Stromberg-Carlson Telephone Manufacturing Company. Lee is chairman of the Sales Manager Club in Rochester and is a member of that city's Postwar Council. Early in 1943 he was elected a trustee of the Mechanics Savings Bank of Rochester. — Of particular interest is the recent incorporation of Stevens-Arnold Company, Boston. The incorporators are D. C. Arnold and E. F. Stevens. The new company will assemble special electrical panels. — JOSEPH S. HARRIS, *General Secretary*, Aviation Department, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Stevens-Arnold Company, Inc., 22 Elkins Street, South Boston 27, Mass.

1934

The question of the best time to hold our tenth annual reunion was settled without much difficulty. With a very few exceptions the consensus was that a June reunion would have many advantages over one in March. Plans are therefore well under way for a bang-up get-together in the early part of June, and considering the committee which is handling the event, we may regard the success of the reunion a foregone conclusion. Here are the boys who are organizing the show: Johnny Hrones, publicity; Bob M. Becker, program; Hank Backenstoss, finances and selection of a memento which may be treasured after the party is over; Les Doten, selection of a good hotel where we can have a rip-snorting time without overtaxing the family budget. There, fellows, is a committee that is a guarantee of your money's worth.

Frank Moore sent in a card voting for a June reunion and also suggested that an extra reunion be held after the war in case hostilities end about halfway between 1944 and 1949. His plan is to have the extra reunion long enough after peace has returned to enable the boys to get home from abroad and then to make up to them for the party they missed. It is a worthy idea and should be given some thought.

Bud Golsan of the New York State Electric and Gas Corporation, Monticello, N.Y., is one of the few who would prefer to have the reunion in March. Here is what he has to say: "... March 4 would suit me better as a reunion date than later on in June or early July. As you know, I am local manager of this area, and our busiest time occurs during June and the first of July. Despite our few industries, you see, we are predominantly seasonal, with a large complement of hotel accounts, which bring pressure to bear on us in June for any and all manner of services, favors, connections, and so on. Hence I don't like to leave here during that period. (You'd be surprised at the tremendous gang of people who came here last year; you'd think there was no such thing as a war!) In any event, I'll try my best to get to any 10th reunion, anywhere, anytime. ..."

We hope that Bud will be able to arrange his affairs in such a way as to be with us. We certainly should miss him. That

goes for a lot of you fellows, also. You have a long time in which to make your plans; so begin now. We want to see what you look like in June.

Oscar Hedlund passed along a letter written to him by Herb Plass in Sicily. Here it is: "Jean mailed your card on to me over here, and it arrived recently to remind me that I haven't written to anyone at M.I.T. since I left the States last fall for Africa. We managed to see Casablanca, Oran, Algiers, Tunisia, and a good many way stations in between. Then along came this present diversion; so we tagged on and came here. I haven't met anyone I knew at school — which is understandable because I've been seeing for the most part either Air Forces units or hospital units. I saw a lot of boys who were in medical school with me, though, so that life hasn't been entirely without reunions. I ran into my brother-in-law here on the island. He's a surgeon with one of the hospitals and, like so many others, has been sick for about two months with malaria and dysentery. I've been lucky and haven't had much trouble myself.

"I'm still in the same group that I joined over a year ago, still a squadron surgeon, and not doing anything in particular to earn my pay. The pilots do all our fighting, of course, and the rest of us just sit on the ground and eat up the quartermaster's rations and wear out the seats of his pants. ... It's going to be hard to settle down and practice medicine again after this roaming around is all over. For one thing, I shan't know any medicine!"

— JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, First Special Service Force, care of Postmaster, New York, N.Y.

1939

We have a dramatic item concerning Harry Kittredge. He entered the Army more than 21 months ago and, after training in Texas, was shipped overseas on May 30. Of his part in the big raid on Rabaul, navigating a bomber, the Rochester *Times-Union* of October 14 said in part: "Bombs from the big Liberator were dropped on their target, at least one Japanese Zero was shot down, the American plane survived a crash landing and the crew later was picked up by another plane, but still Lieut. Harry Kittredge of Rochester complained. 'Throughout the trip,' a United Press delayed dispatch quotes him as saying after participation in the big raid on Rabaul. ... 'I had to navigate the ship and couldn't get into action with my machine gun.'

"Icy winds ripped through the plane, the press dispatch reports, as the bomb bay doors swung open. Members of the crew could see Zeros whipping across the air-drome below and racing up toward the raider. The thousand pound bombs coursed downward and black puffs of smoke from anti-aircraft fire dotted the sky around the plane as the bomb bay doors rattled shut. ... Machine gun and cannon shells ripped into the big bomber as for the next 30 minutes it fought swarms of enemy planes. One motor was shot out of commission and another was damaged. Machine guns of the American ship were smoking and almost red hot before the battle ended. One Zero

was seen crashing down in flames, while two others were severely damaged and probably knocked down, though the Americans had no time to check final results.

"With only three motors running but no casualties among the crew, the Liberator headed for home. Gasoline ran low and the pilot decided to make a crash landing on an island. As the plane touched the ground the left wheel, apparently damaged in the fight, collapsed. Later the crew was picked up by another Liberator on its way home from a subsequent assault on Rabaul. ..."

— STUART PAIGE, *General Secretary*, Fairport Road, Westfair Village, Westport, Conn. ROBERT C. CASSELMAN, *Assistant Secretary*, 271 Cypress Street, Newton Center 59, Mass.

1940

The important item of news for this issue is that we have heard from Hap. In December, Mrs. Farrell received a card written from a Japanese prison camp in which he said that he is in good health and feels fine. After the war, he plans to return to M.I.T. for a year of study in automotive engineering and business. The next thing after that on his list is a motor tour throughout the United States. He sent his best regards to all his Technology friends.

— H. GARRETT WRIGHT, *General Secretary*, 1124 Greenwich Street, San Francisco 9, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Apartment 436, 2032 Belmont Road, Northwest, Washington, D.C. JOHN L. DANFORTH, *Acting Assistant Secretary*, Room 24-123, M.I.T., Cambridge 39, Mass.

1941

It has been so long since we have heard from any of our coed classmates that we were pleased to have Florence W. Stiles '22, architecture librarian at the Institute, pass along the following letter from J. Gladys Thompson: "... Like the majority of my Class, including those in the services, I have been busy moving about. The Edward G. Budd Manufacturing Company in Philadelphia, where I was a stress analyst on the wings and stabilizers of the big bombers, was first in claiming a year of my time. Last September an excellent opportunity was offered me with the Simmonds Aerocessories, Inc., of New York. There I worked again as stress analyst but on an experimental hydraulic system for a newly designed Lockheed bomber. The bombers were left this June when I accepted the position of art and production manager for the American Society of Civil Engineers. Most of my work entails editing the technical drawings which illustrate both *Civil Engineering* and the *Proceedings*. The job covers a broad field of engineering, and I find it very absorbing.

"I discovered many of my classmates at Wright Field when I was out there recently. Not long ago I met Frances Ross, who is now Frances Kaplan. She gave me a little news, saying that Edith Rovner had married Charles Corliss, and that Gloria Kay had recently married Andrew Peacock '43. The Review is most helpful in tracing classmates, but I wish more of the fellows would write in to it. ... (And so do we. — Sec.)

J. Lester Klein is now with Jessop Steel Corporation of Washington, Pa., as metal-

1941 Continued

lurgical research engineer, having left his job as research metallurgist with the Crucible Steel Company of America.

Irv Koss writes: "My position at Monmouth has been an excellent one from which to watch the Technology lads go by, and there have been many of them. At least there were many of them until the Class of 1942 went by. Maybe it isn't time for '43 yet — I don't know. Since all Reserve Officers' Training Corps boys are going to officer candidate school, we never know when to expect a group of college men. I'm still on the staff and faculty of the officers' school of the Eastern Signal Corps Schools. My rank these days is captain. Last May, I married Ensign Shanor, a Carnegie Institute of Technology graduate who joined the WAVES. I got a letter from Joe Myers the other day and he's on his way. You'll recall that we both went to Carnegie-Illinois Steel.

"Phil Lewis is also stationed at Monmouth. He's married and is always telling me about their little baby. J. J. Quinn '42 successfully campaigned for a transfer in grade to flight training in the Air Forces. He went to Texas last year, and he dropped in to say hello while he was here on leave after he got his wings. He said he was transport pilot. Bill Schwindler and Pat Woodbury Schwindler are having a swell time in Dayton, Ohio. You remember that Pat was Miss Barnard's assistant. Their last letter was full of victory garden canning achievements. Maybe Bill's going to compete with Heinz and their 57. They write that Al Booth and Jackie Kinney are out that way, too."

Les Corsa comes through from Harvard Medical School with this communication: "I met Captain Bob Coombs about a month ago outside the Boston Lying-In Hospital, where his wife and baby daughter were, and I saw George Clark on a week-end trip to New York between terms in August; he's still a Signal Corps captain at Mitchel Field. I see Lew and Elizabeth Jester regularly here. Still get over to Technology to run occasionally, although the Army program gets in the way once in a while. We've got a bunch of fellows here who aim to make up a cross-country team provided we can train and still stay awake to study nights. If we do, we'll get meets with Technology, Harvard, Tufts, and so on, and have some fun out of it."

Among those with A.P.O. addresses are Captain William F. Hart, Jr., Major Norman Shapira, and Lieutenant John E. Stadig. Others who seem to have shifted a bit are Knut Johnsen, now in Warren, Pa.; James L. Hall, in Mahwah, N.J.; Norton Polivnick, in Wichita, Kansas; John Cutler, in New York City; Mike Driscoll, in Costa Rica; and Henry Faul, of the Union Mines Development Corporation, Grand Junction, Colo.

Johan Andersen catches us with an armful of news at the right moment: "I left Technology and the Chemical Warfare Service Laboratory last June when attempting to get into the Army. But the medical board said I was perfect 4-F material because of an ankle that I broke in a number of places before going to the Institute. When the Army said no, I went back to the family business of making electrical supplies and, at present, cartridge cases for various services. I have seen two fellows in

the last months and that party came off recently. Bill Folberth and Jim Thornton were the other beer drinkers, and the place was the German American in New York City. Thornton is now a captain, teaching radio at Fort Totten, N.Y. Bill is on special duty in a similar line for the Air Forces, working out of Mitchel Field and living at Lynbrook on Long Island. The news these fellows had was meager. One fact was gleaned, however: Frank Storm, a captain, is now back from Moscow and has been sent to take flight training somewhere in the South."

We received a card from Jane and Larry Turnock located in Baltimore, one from Alice and Les Gott in Watervliet, N.Y., and one from Barbara and Rod Finch listing Gloversville as their location. — Walking through the Roosevelt lobby with Fred Lykes '42 recently, we were accosted by a Transportation Corps captain who attended administration classes with us at the training center. He turned out to be Curt Buford '42, who is with the Military Railroad Service. Fred afforded the mutual recognition factor. — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester 21, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, 136 Beacon Street, Boston 16, Mass.

1942

Except for a few most welcome Christmas cards which have managed to follow the deceptive trail of your Secretary afield, knowledge of classmates leaves a sucking noise in the class mailbox. How about this now? Your Secretaries noted with no chagrin, however, a bit of a rise in the Class's contributions to the Alumni Fund. Those who have read the President's Report can easily see the need for more than adequate support of the Alumni Fund to aid in the conversion of the Institute from the large part it is playing in the war effort to the role it is destined to assume in postwar education.

Recently your Secretary encountered none other than the jovial face of Jack Arend, a welcome sight in the bleak countryside of New Mexico. Jack, a lieutenant, is one of the proud possessors of both bombardier and navigator ratings in the Air Forces (for which your Secretary is now working at Roswell, having completed the first step toward the two at navigation school). Jack is stationed at Clovis, about two hours "by the mad bus driver" from Roswell. After pursuing Jack through some ten or so Army addresses, we find it a relief to know where he is stationed *now*! Jack was recently back at the Institute, which is quite different from what it was in April, 1942. With the Navy's V-12 program, the Army Specialized Training Program, and the aviation cadets, the school has a larger student body than normally. Jack also visited the high spots from Roswell to Boston and return. Perhaps some of you Bostonians and others are wondering why his smiling face didn't brighten your parlor or such. I think the answer is that the stay-at-homes (or not, as the case may be) are much too shy with information about themselves and families for the servicemen to know where to find whom on leave. A pretty desperate situation, we call it!

Last news of Carl McGinnis is that he is no longer flying torpedo bombers for the Navy at Glenview, Ill., where he finished

the carrier landing course. — From Lieutenant Bernard Levere, "somewhere in Britain," came a most thoughtful Dave Breger V-Mail Christmas card. — Word comes that Jim Girdwood, lieutenant, United States Marine Corps, has also been in Boston of late. Jack Loveland, recent acquirer of an M.S. degree in Course X-A, has not been inactive in other fields either. Rumor has it that not many weeks from now wedding bells will ring for Estelle Graham and Jack. Lieutenant Bill Hense on the 30th of October spent his last few hours as a lone wolf; Pine Bluff, Ark., was the place, and Lorraine Hermes is the new Mrs. Hense. Bill Whitcomb, now studying at the medical school of Boston University under the Army Specialized Training Program, is engaged to Anna Danzer, Smith College alumna. No date for the ceremony has been announced as yet. Warren Menke and Charlotte Robinson are now living in Danvers, Mass., after a few kind words were spoken at the bride's former home in Winchester. Herbert Harvey, an ensign, was married in September to Judy Brown of Buffalo, N.Y.

Newman Marsilius, who received his M.S. in Course XV, has been promoted to captain "somewhere overseas," either still suffering from some of Major Caswell's jiu-jitsu expositions or having profited vicariously from the same. He is still with the Army Ordnance Department. Hugh Schwarz, after receiving his M.S. and being assistant director of the Bangor station in the Course X practice school, has left Bangor for Boston, where the National Research Corporation claims his working hours. His wife is the former Mary Louise Connors of Bangor.

Well, that puts the lid on this month's news. Kind of skimpy, eh? We know what to do about it, don't we folks? — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. KARL E. WENK, JR., *Assistant Secretary*, 228 Marlborough Street, Boston 16, Mass.

1943

It is with the very deepest regret that I record the death of Matthew Mank. He was a pilot officer in the Royal Canadian Air Force and was killed in a bombing mission over Germany last April 15. At first he was reported missing when it was believed that his was one of 23 planes lost in a raid over Stuttgart. Matthew was registered in Civil Engineering at Technology, but left the Institute early in 1941 to join the R.C.A.F. He had been overseas for 20 months.

Jack Tyrrell has written as follows: "... My story can be condensed into about two sentences. I'm working for the Allegheny Ludlum Steel Corporation in a plant about 20 miles above Pittsburgh. I spent the first eight months working in four or five departments of two different plants and finally wound up in a desk job, handling service problems concerning stainless steel. It's interesting because I don't know a thing about the stuff, and I sort of sit around waiting for my neck to be chopped off when I stick it out on some of these problems. There don't seem to be any fellows from our Class around here anywhere. At least, I've tried most of the bars and haven't run into any, so that is a pretty good sign that there aren't many within drinking distance of Pittsburgh.

Have you made your reservation for Alumni Day, Saturday, February 26?

"Dick Childerhose is working in Hartford for United Aircraft and says he runs into Dick Foley and E. C. McClaud quite regularly. He sends word about two of his ex-roommates — Kemp Maples and Barrie Mackenzie. Kemp was at Quantico with the Marines and expected to get back to the Institute for some work on detection instruments; Barrie was in the Army at Camp Croft, S.C. . . .

"The last I heard of George Marakas was that he expected to be transferred to Boston to work in a foundry in that vicinity. Red Brindis, in the Navy, was doing quite a little traveling from station to station on chemical warfare work. Tom Dolan has settled down to married life in Wilmington, Del. I haven't heard from Harry Ottinger in a long time, but the latest was that he was getting along pretty well in Baton Rouge, La." — Jack has written a postscript to his letter which I pass on to you: "Don't forget to remind everybody about the Alumni Fund."

The letter which Jack enclosed from Mer-ton Hubbard says: "Although I don't know that I am the first of our Class to be sent overseas (July, 1943), I do believe that I hold the dubious honor of having been across most frequently — three trips by the time this reaches you. Following my Chemical Warfare training at the Institute, I was sent to a Quartermaster officer candidate school, and a month after being commissioned was transferred to the Transportation Corps as a cargo security officer. The only other bit of news about myself is that I became engaged to Elaine Schneider fairly recently; the marriage date is still undecided. You may remember seeing her around at the various Tech dances."

A great deal of news of Course VI men comes from Lou Schwartz, who writes: ". . . I attended officer candidate school at Fort Monmouth with the other Reserve Officers' Training Corps students in the Signal Corps unit. Among the fellows graduated were Leo Duval, Ovide Fortier, John Sewell, Jim Castanias, Warren Schwarzmenn, Paul Hotte, Joe Goodman, yours truly, and a few others whom I don't recollect at the moment. A number of the above-mentioned fellows attended, or are attending, electronics schools at Harvard or Technology. Leo Duval has recently written that Sewell and Fortier are at Camp Murphy, Fla., doing electronics work. Leo and Warren Schwarzmenn are now at the Institute finishing their electronics training. Clyde Booker, who also was graduated from officer candidate school with us, is overseas, according to Leo, heading for Africa at the last count.

"Ray Frankel, an ensign, is at M.I.T.; Hal Gershenow, also an ensign, is stationed at the Charlestown Navy Yard; the third member of that trio, Bill Katz, has recently married. Al Milman is scheduled to head for the West Coast after finishing a special antiaircraft course. Read Stevens, who studied detection instruments at Technology as an ensign after getting his naval indoctrination, is now in the Pacific. His last letter was written from a Landing Ship, Tank, and he seems to be having a great old time. He writes that his buddy, Pete Wheeler, is also in the Navy. Sam Scharff is at Fort Monmouth, and Jim McDonough, when last heard of, was at officer candidate school at Fort Belvoir, Va. Other members of Course VI — Gagarin and Myron Shoffner — are at Technol-

ogy also, in the Army course on detection instruments.

"Dick Adler and Don Powers are instructing at the Institute now. Bill Root, who was a lab instructor, is now in the Navy and recently has been seen around Cambridge. I noticed you mentioned that Bud Greenwald was married. He has been stationed at Staten Island, N.Y., for the time being. As for myself, I'm presently assigned to the Detroit Signal laboratory and am managing to keep busy. I am taking a night course in navigation in preparation for a grand sailing jaunt around the post-war globe!"

News comes of Cecil Alexander in a letter from his father. Cecil is a first lieutenant in the Marine Aviation Corps, where he is pilot of a dive bomber. At present he is stationed somewhere in the Pacific. — Being in the Army is not without its more humorous moments: Hugh Byfield, for instance, left the Institute in order to join the Army. But the Army was all set to send him back to Tech, until a last-minute change in plans which ordered him to the University of West Virginia! — I observed with satisfaction that General Radio selected a very suitable advertisement for the back cover of the December Review. Bill Thurston is there depicted tinkering with various knobs and dials and, judging by his notebook, he seems to be really getting results.

This month I have only three engagements to record: Ensign Albert Harno and Nancy Loker; Ensign Haven Fifield and Janet Haines; and Ensign Bernie Brindis and Sylvia Winer. — CLINTON C. KEMP, General Secretary, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

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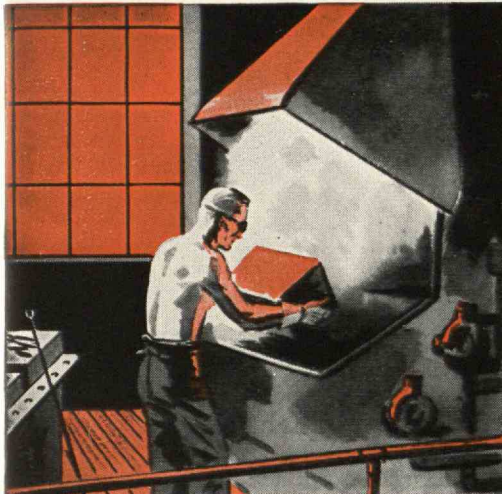
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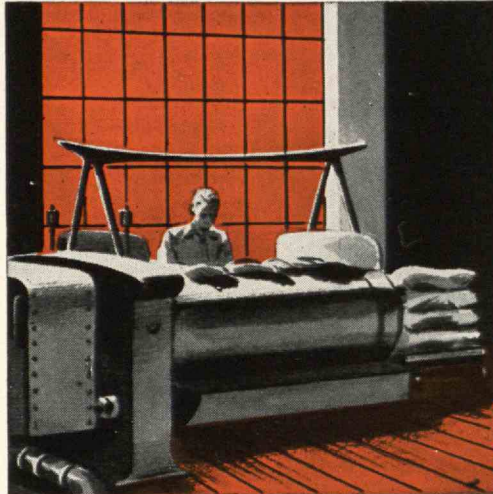
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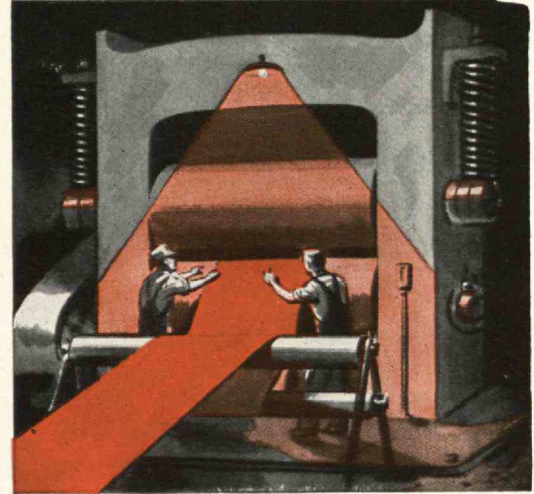
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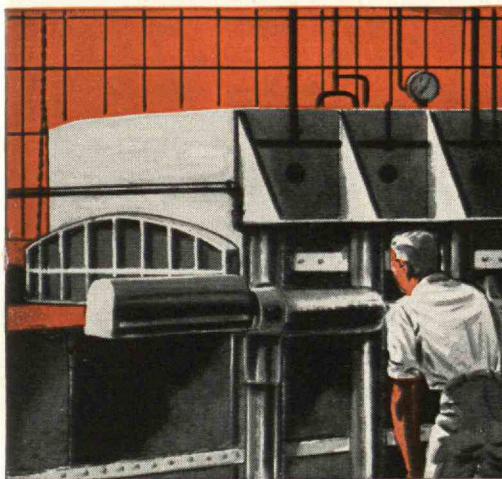
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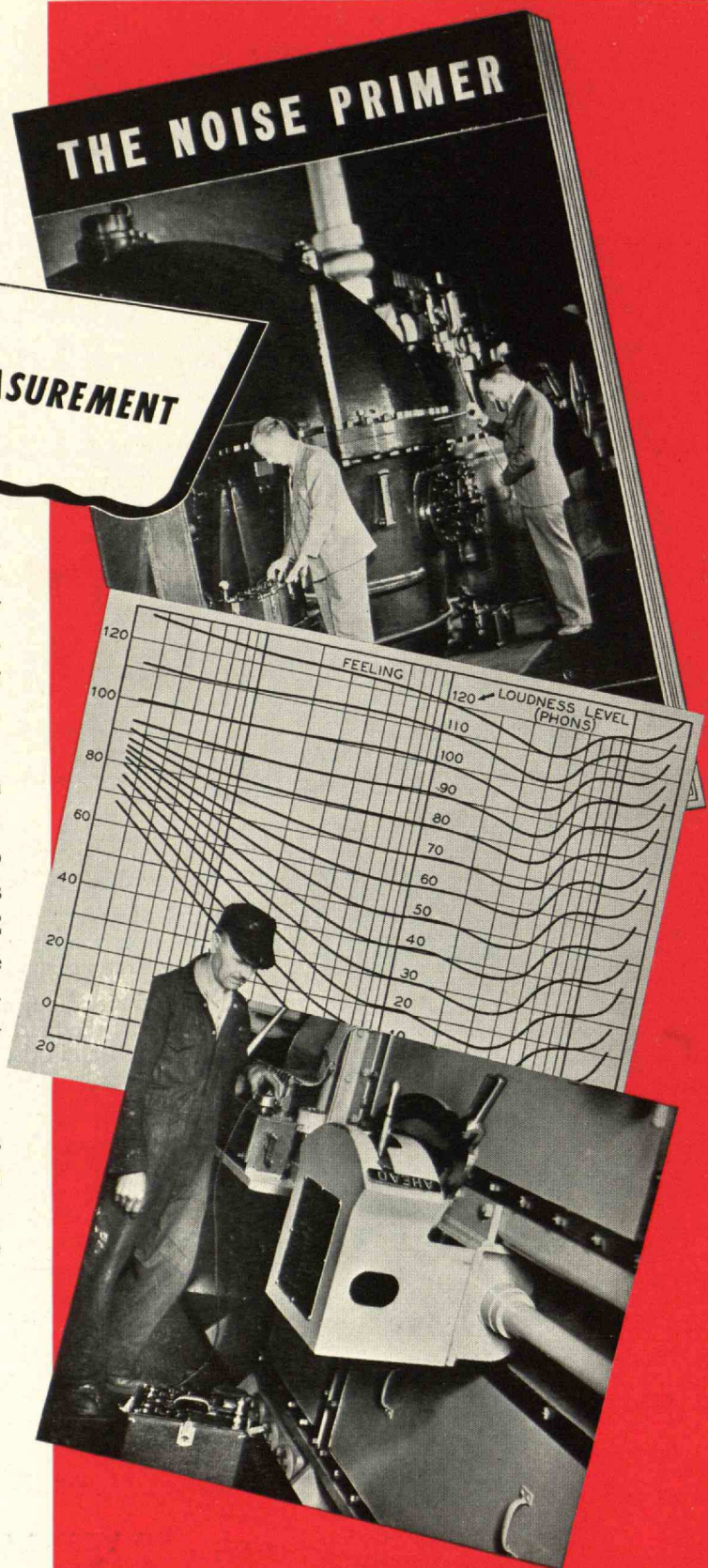
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